CLAIMS

1. The use of an onium salt functionalized by at least one organic function, as a soluble support, in the presence of at least one organic solvent, for the organic synthesis of a molecule, in homogeneous phase, by at least one conversion of said organic function, said onium salt allowing the release of the synthesized molecule,

said onium salt being presented in liquid or solid form at ambient temperature, and corresponding to the formula A_1^+, X_1^-,

in which: – A_1^+ represents a cation,

– X_1^- represents an anion,

A_1^+ being a functional or polyfunctional cation, and/or

X_1^- being a functional or polyfunctional anion,

the onium salt being such that in its initial form, i.e. before the first conversion of said organic function, A_1^+ and X_1^- are not bound together by a covalent bond,

and when the anion and the cation respectively carry an organic function, these cannot react with each other before the first conversion of said organic function.

2. The use according to claim 1, characterized in that the onium salt is purified and/or recycled in its initial form after the release of the synthesized molecule.

3. The use according to claim 1 or 2, characterized in that the functional cations and anions correspond to an ionic entity, cationic Y^+– and anionic Z^-– respectively, optionally bound by means of an arm, L and M respectively, in particular an alkyl or aralkyl or alkaryl group comprising 1 to 30 carbon atoms, to at least one function F_i and F'_i respectively, F_i varying from F_0 to F_n, F'_i varying from F'_0 to F'_n, n being an integer varying from 1 to 10,

the functional cation A_1^+ being able to be represented in the form Y^+–L–F_i, and

the functional anion X_1^- in the form Z^-–$(M)_k$–F'_i, k being equal to 0 or 1.

4. The use according to any one of claims 1 to 3, characterized in that the organic functions F_i and F'_i are chosen from the standard functions of organic

chemistry, such as the hydroxyl functions, carboxylic acid, amide, sulphone, primary amine, secondary amine, aldehyde, ketone, ethenyl, ethynyl, dienyl, ether, epoxide, phosphine (primary, secondary or tertiary), azide, imine, ketene, cumulene, heterocumulene, thiol, thioether, sulphoxide, phosphorated groups, heterocycles, sulphonic acid, silane, stannane or functional aryl.

5. The use according to any one of claims 1 to 4, characterized in that the molecular weight of the functionalized onium salt is less than 1500 $g.mol^{-1}$, in particular less than 750 $g.mol^{-1}$, and is preferably comprised from 130 to 500 $g.mol^{-1}$.

6. The use according to any one of claims 1 to 5, characterized in that A_1^+ is a functional cation and in that X_1^- is a non-functional anion.

7. The use according to claim 6, in which the onium salt A_1^+, X_1^- has as its initial form Y^+–L–F_0, X_1^-, for obtaining a molecule G, by conversion of said initial function F_0 according to the diagram

$$Y^+\text{-L-}F_0\ ,\ X_1^- \longrightarrow Y^+\text{-L-}F_i\ ,\ X_1^- \longrightarrow \cdots \longrightarrow Y^+\text{-L-}F_n\ ,\ X_1^-$$

L being as defined in claim 3,

said molecule G being obtained by cleavage of the function F_n,

and the functionalized onium salt being able to be recovered or recycled in its initial form Y^+–L–F_0, X_1^-, after the release of G.

8. The use according to any one of claims 1 to 7, characterized in that the functional cation A_1^+ is chosen from the pyridinium, imidazolium, ammonium, phosphonium or sulphonium cations, cyclic or non-cyclic, substituted or non-substituted, and preferably ammonium or phosphonium.

9. The use according to claim 8, characterized in that the functional cation A_1^+ is chosen from the quaternary ammonium cations, cyclic or non-cyclic.

10. The use according to any one of claims 1 to 5, characterized in that X_1^- is a functional anion and A_1^+ is a non-functional cation.

11. The use according to claim 10, in which the onium salt A_1^+, X_1^- has as its initial form A_1^+, Z^--$(M)_k$-F'_0, for obtaining a molecule G, by conversion of said initial function F'_0 according to the diagram

$$A_1^+ , Z^-\text{–}(M)_k\text{–}F'_0 \longrightarrow A_1^+ , Z^-\text{–}(M)_k\text{–}F'_i \longrightarrow \cdots \longrightarrow A_1^+ , Z^-\text{–}(M)_k\text{–}F'_n$$

k and M being as defined in claim 3,

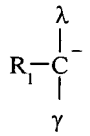
said molecule G being obtained by cleavage of the function F'_n,

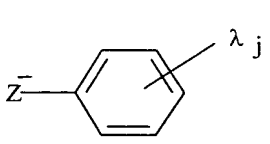
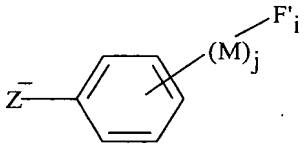
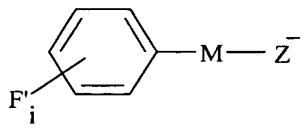
and the functionalized onium salt being able to be recovered or recycled in its initial form A_1^+, Z^-–$(M)_k$–F'_0, after the release of G.

12. The use according to claim 10 or 11, characterized in that X_1^- is chosen from:

- the family of the phosphates: $R_1PO_4^{2-}$, $R_1R_2PO_4^-$,
- the family of the sulphates: $R_1SO_4^-$,
- the family of the sulphonates: $R_1SO_3^-$,
- the family of the carboxylates: $R_1CO_2^-$,

or from the following anions:

$R_1\bar{N}SO_2R_2$ $R_2SO_2\bar{N}SO_2R_2$ 

Z^-, M and F'_i being as defined in claim 3, Z^- representing in particular O^-, SO_3^-, CO_2^-, $R_1PO_3^-$ or $R_1PO_2^-$,

j representing an integer comprised from 1 to 5,

R_1 and R_2 being able to represent independently of one another a functional alkyl group, a vinyl or alkynyl group, optionally functional, comprising from 1 to 20 carbon

atoms, or being able to represent a functional aryl group comprising from 6 to 30 carbon atoms,

γ and λ representing an electroattractive group, in particular chosen from the groups: CO_2R', SO_2R', CN, NO_2, $P(O)(OR')_2$, $C(O)R'$ and SO_3R',

R' representing an alkyl group, optionally functional, comprising from 1 to 20 carbon atoms, or an aryl group, optionally functional, comprising from 6 to 30 carbon atoms.

13. The use according to any one of claims 1 to 5, characterized in that A_1^+ is a functional cation and X_1^- is a functional anion.

14. The use according to claim 13, in which the onium salt A_1^+, X_1^- has as its initial form Y^+–L–F_0, Z^-–$(M)_k$–F'_0, for obtaining a molecule G, by conversion of said initial functions F_0 and F'_0 according to the diagram

$$Y^+\text{-L-}F_0\ ,\ Z^-\text{-}(M)_k\text{-}F'_0 \longrightarrow Y^+\text{-L-}F_i\ ,\ Z^-\text{-}(M)_k\text{-}F'_i \longrightarrow \cdots \longrightarrow Y^+\text{-L-}F_n\ ,\ Z^-\text{-}(M)_k\text{-}F'_n$$

L, k and M being as defined in claim 3,

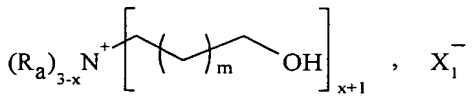
and by reaction of F_n on F'_n in the functionalized onium salt Y^+-L-F_n , Z^--$(M)_k$-F'_n leading to the formation of an internal salt of formula:

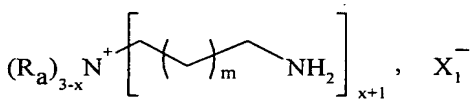
$$Y^+\text{-L-}F_{n+1}\text{=}F'_{n+1}\text{=}(M)_k\text{-}Z^-$$

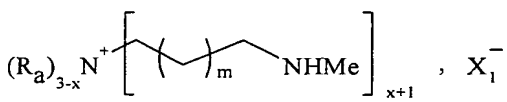
said molecule G being obtained by cleavage of the abovementioned internal salt and corresponding to the formula F_{n+2}-F'_{n+2},

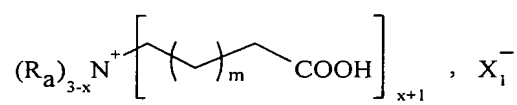
and the functionalized onium salt being able to be recovered or recycled in its initial form Y^+–L–F_0, Z^-–$(M)_k$–F'_0, after the release of G.

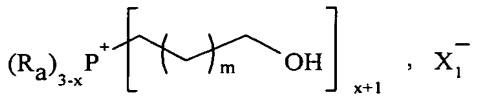
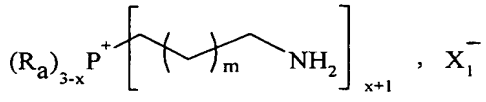
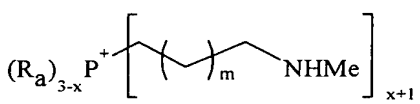
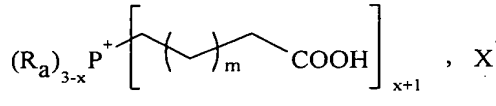
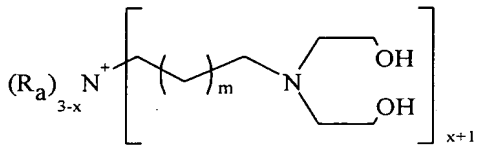
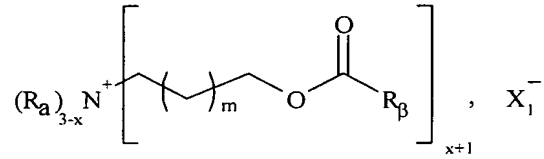
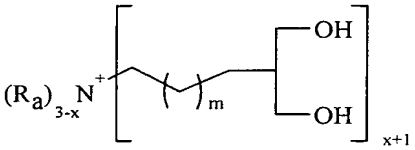
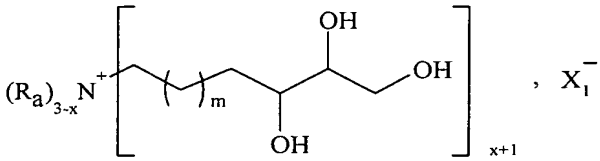
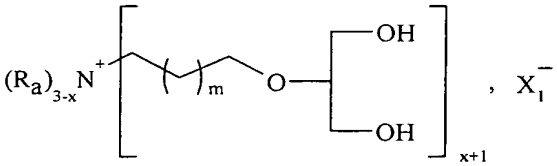
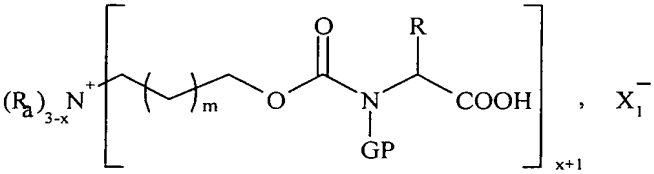
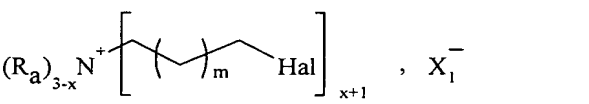
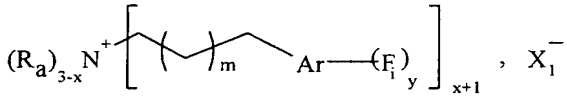
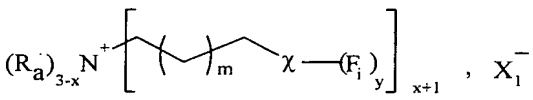
15. The use according to any one of claims 1 to 14, characterized in that the onium salt is chosen from the following salts:









R representing a hydrogen atom, an alkyl group, functional or non-functional, comprising from 1 to 20 carbon atoms, or an aryl group, functional or non-functional, comprising from 6 to 30 carbon atoms,

x representing an integer comprised from 0 to 3,

y representing an integer comprised from 1 to 5,

Ar representing a functional or polyfunctional aromatic ring,

F_i being as defined in claim 4,

Hal representing a halogen atom, in particular chosen from chlorine, bromine and iodine,

χ representing a carbocycle or a functional heterocycle,

X_1^- being chosen from: NTf_2^-, PF_6^-, BF_4^-, Cl^-, Br^-, I^-, $CF_3SO_3^-$, $MeSO_4^-$, $EtSO_4^-$, $MeSO_3^-$, $C_6H_5SO_3^-$, $pMeC_6H_4SO_3^-$,

m being an integer comprised from 0 to 20,

R_β representing a dienyl, vinyl group, substituted or non-substituted, functional alkyl comprising from 1 to 20 carbon atoms, or functional aryl comprising from 6 to 30 carbon atoms, substituted or non-substituted alkynyl, and being in particular an alkylvinyl, alkylalkynyl, alkylaryl, alkyldienyl, alkylmalonyl, acyl group,

and R_a representing a branched or non-branched alkyl group comprising from 1 to 20 carbon atoms, in particular an ethyl, propyl, butyl, pentyl, hexyl, heptyl or octyl group.

16. The use according to any one of claims 1 to 15, characterized in that the solvent(s) used is/are a solvent aprotic, chosen from:

– solvents the dielectric constant ε of which is less than or equal to 2, such as the alkanes, the aromatic carbides such as benzene, toluene or xylene,

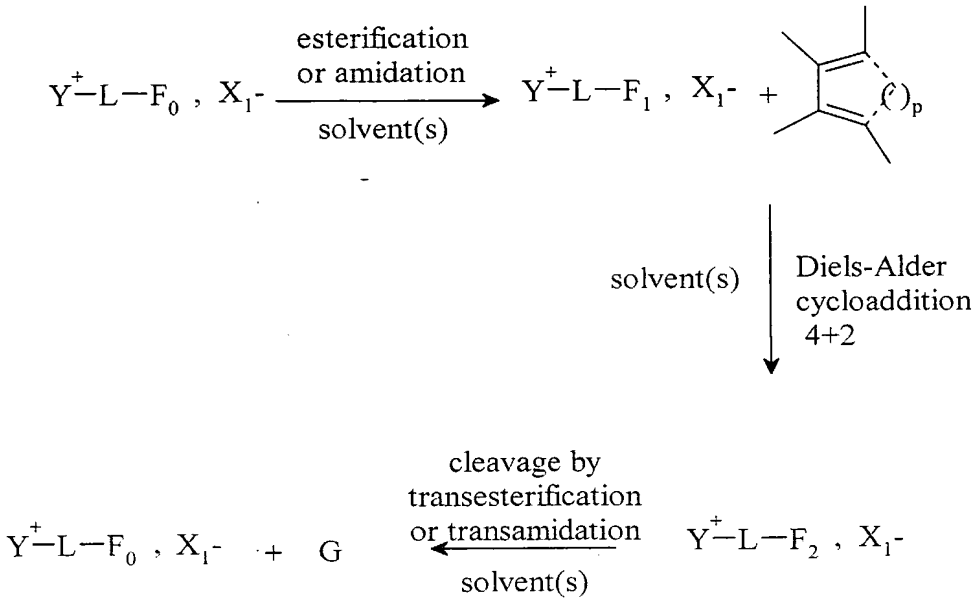
– solvents the dielectric constant ε of which is comprised between approximately 2 and 15, such as the ethers, halogenobenzenes or dichloromethane, and

– solvents the dielectric constant ε of which is greater than 15, such as acetonitrile, nitromethane, DMF or dimethylacetamide.

17. The use according to any one of claims 1 to 16, for continuous, discontinuous, combinatorial or parallel organic synthesis, and/or for the preparation of banks of products.

18. The use according to any one of claims 1 to 17, for the implementation of cycloaddition reactions, preferably for the implementation of the Diels-Alder reaction, according to one of the following reaction diagrams:

a)



p being an integer varying from 0 to 2,

Y^+– representing an onium cation as defined in one of claims 3 to 17, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 6 to 30 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 2 to 10,

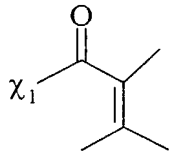
X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

the functions F_0, F_1 and F_2 being as defined below:

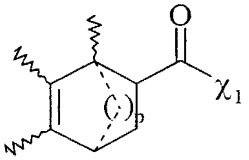
– F_0 corresponds to a $-\chi_1H$ group, in which χ_1 represents an oxygen atom or an $-NR_f$ group, R_f corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

– F_1 corresponds to the following formula:



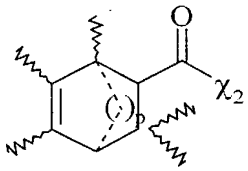
χ_1 being as defined above,

– F_2 corresponds to the following formula:



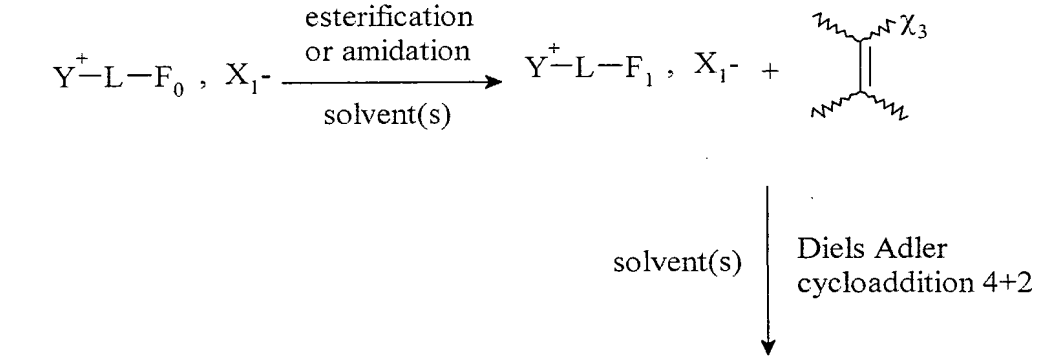
χ_1 being as defined above,

G corresponding to the following formula:



in which χ_2 represents either an OR_g group, R_g representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an $-NR_hR_u$ group, R_h and R_u representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

b)



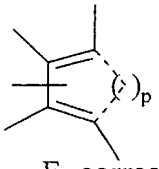
Y^+–, L and X_1^- being as defined previously,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, or a mixture of these solvents,

the functions F_0, F_1 and F_2 being as defined below:

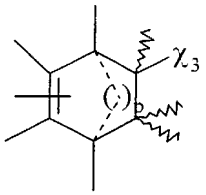
– F_0 represents any function making it possible to attach a 1,3-diene, and is in particular chosen from the carbonyl, amine, alkoxy, silane, stannane and borane functions, comprising from 1 to 20 carbon atoms,

– F_1 corresponds to the following formula:



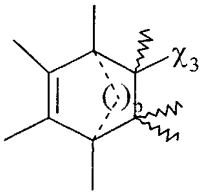
p being an integer varying from 0 to 2,

– F_2 corresponds to the following formula:



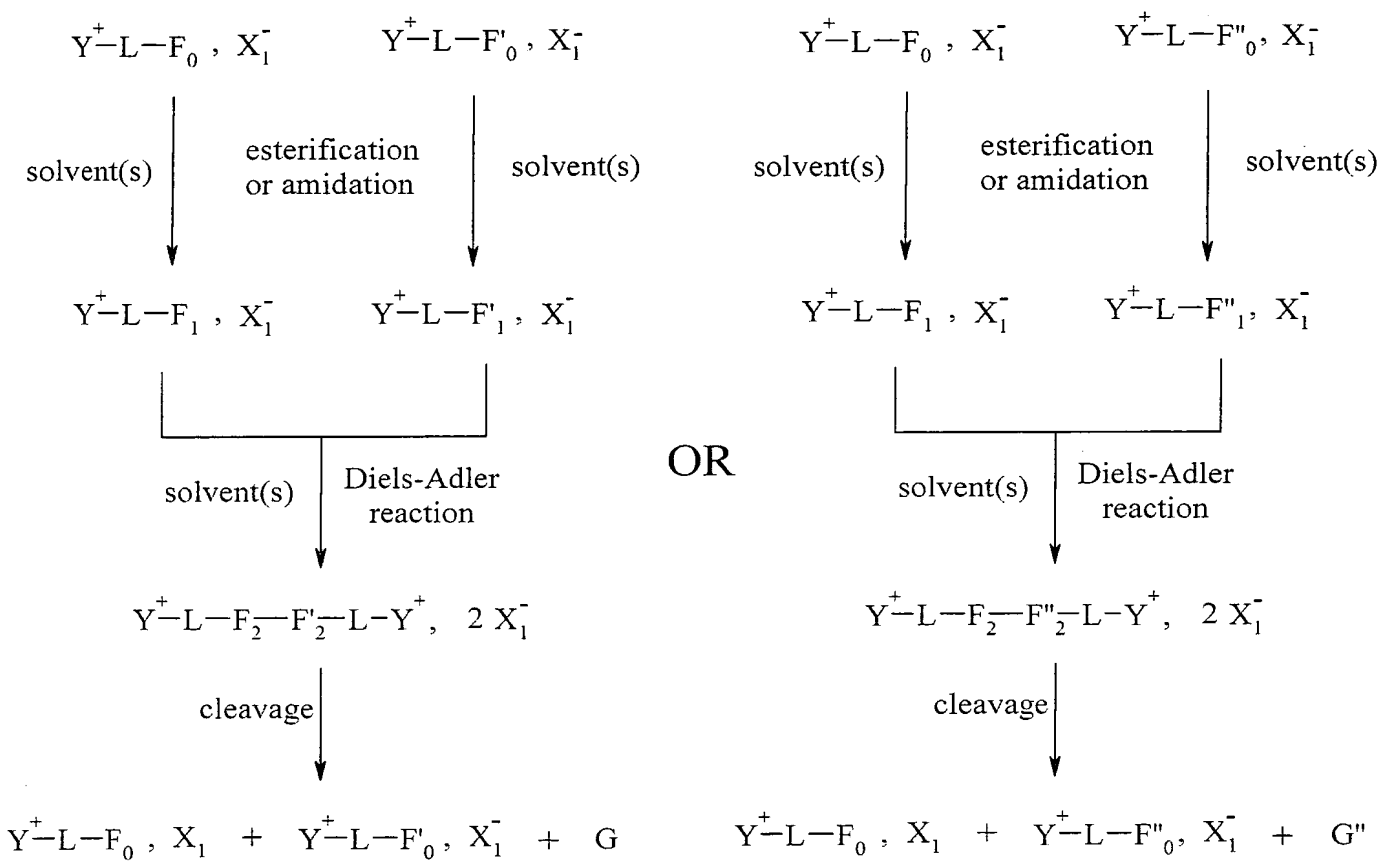
χ_3 representing an electroattractive group, in particular chosen from the cyano, alkoxycarbonyl groups, comprising from 1 to 20 carbon atoms, acyl comprising from 2 to 20 carbon atoms, benzoyl, sulphonyl, dialkoxyphosphonyl comprising from 1 to 10 carbon atoms,

G corresponding to the following formula:



χ_3 being as defined above.

c)



Y^+–, L and X_1^- being as defined previously,

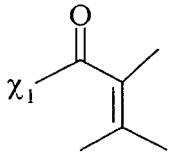
the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

the functions F_0, F'_0, F''_0, F_1, F'_1, F''_1, F_2, F'_2 and F''_2 being as defined below:

– F_0 and F'_0 correspond respectively to a $-\chi_1H$ and $-\chi'_1H$ group, in which χ_1 and χ'_1, identical or different, represent an oxygen atom or an $-NR_f$ group, R_f corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

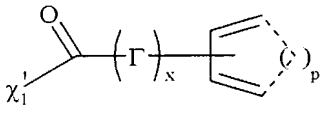
– F''_0 corresponds to a -COOH function;

– F_1 corresponds to the following formula:



χ_1 being as defined above,

– F'_1 corresponds to the following formula:



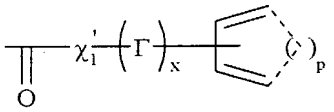
p being an integer varying from 0 to 2,

χ'_1 being as defined above,

x being equal to 0 or 1,

Γ representing an alkyl chain comprising from 1 to 30 carbon atoms, alkaryl, aralkyl, aryl comprising from 6 to 30 carbon atoms,

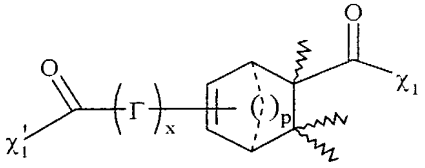
– F''_1 corresponds to the following formula:



p, x and Γ being as defined above,

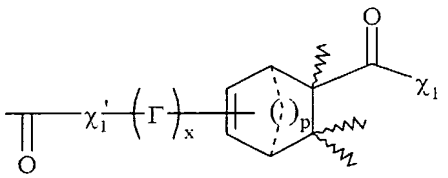
χ'_1 being as defined above,

– F_2-F'_2 corresponds to the following formula:



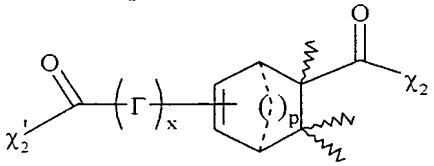
p, χ_1, χ'_1, x and Γ being as defined above,

– F_2-F''_2 corresponds to the following formula:

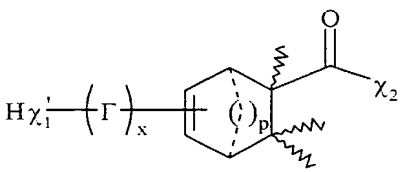


p, χ_1, χ'_1, x and Γ being as defined above,

– G corresponds to the following formula:



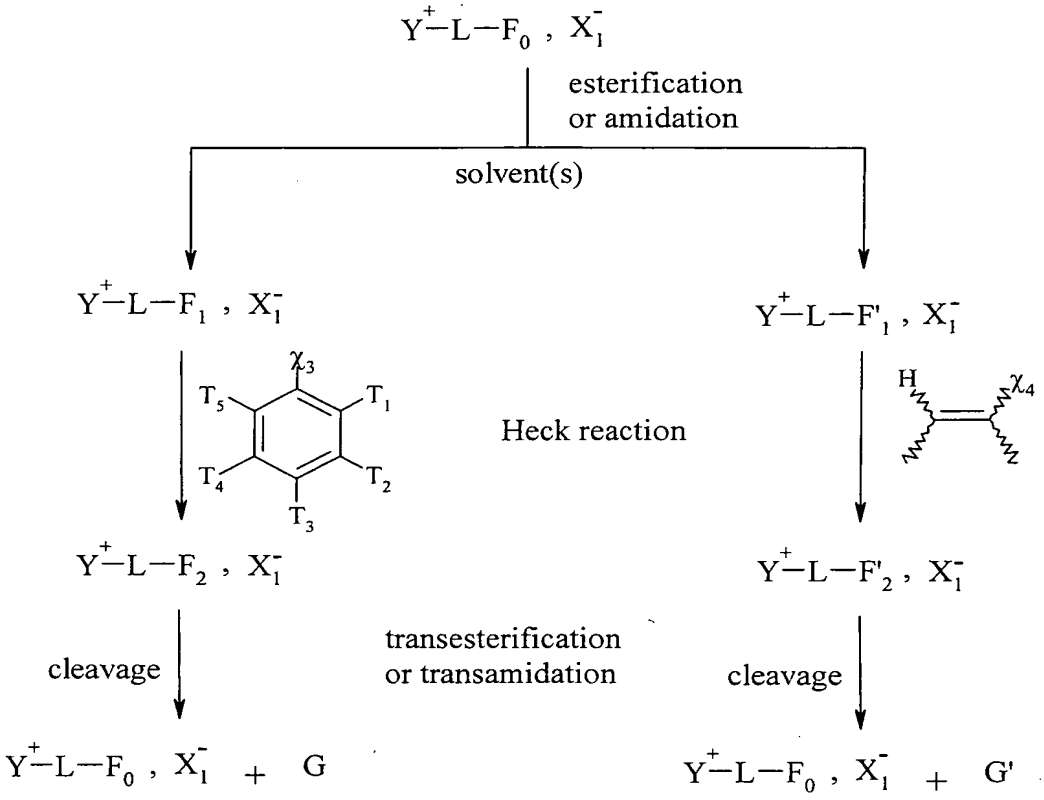
– G'' corresponds to the following formula:



χ_2 and χ'_2, identical or different, represent either an OR_g group, R_g representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an $-NR_hR_u$ group, R_h and R_u representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms.

19. The use according to any one of claims 1 to 17, for the implementation of coupling reactions such as the Heck, Suzuki, Sonogashira or Ullmann reactions.

20. The use according to claim 19 for the implementation of the Heck reaction, according to one of the following reaction diagrams:



Y^+- representing an onium cation as defined in one of claims 3 to 17, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 2 to 10,

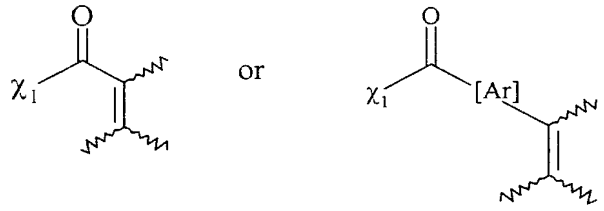
X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

the functions F_0, F_1, F'_1, F_2 and F'_2 being as defined below:

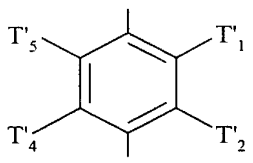
– F_0 corresponds to a $-\chi_1H$ group, in which χ_1 represents an oxygen atom or an $-NR_f$ group, R_f corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

– F_1 corresponds to one of the following formulae:



χ_1 being as defined above,

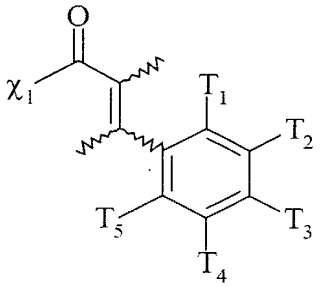
[Ar] representing an aromatic ring, optionally substituted by a linear or branched alkyl group, comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms, or a functional group in particular chosen from NO_2, CN, COOR, OR, COR, NHCOR, NRR', SO_2R, I, Br, R and R' representing independently of one another an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms, [Ar] preferably corresponding to the following formula:



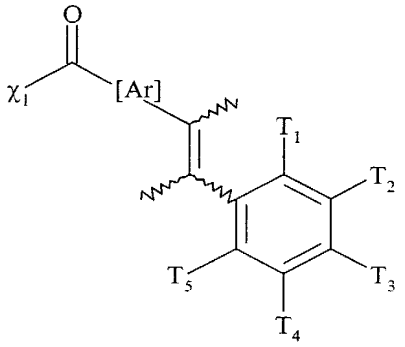
in which T'_1, T'_2, T'_4 and T'_5 represent independently of one another a hydrogen atom, a linear or branched alkyl group, comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms, or a

functional group in particular chosen from NO_2, CN, COOR, OR, COR, NHCOR, NRR', SO_2R, I, Br, R and R' representing independently of one another an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

– F_2 corresponds to one of the following formulae:



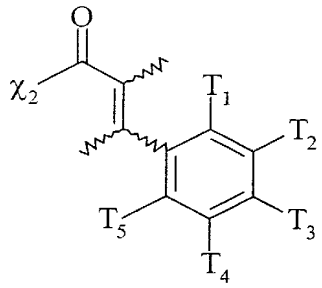
or



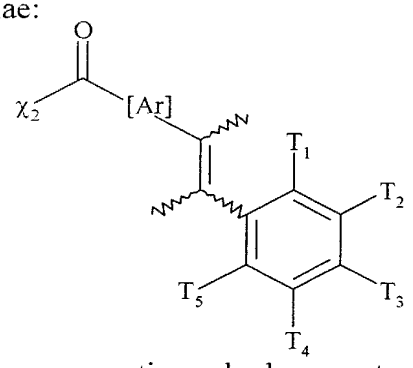
χ_1 and Ar being as defined above,

T_1, T_2, T_3, T_4 and T_5 corresponding to the definition given above for T'_1, T'_2, T'_4 and T'_5

G corresponding to one of the following formulae:

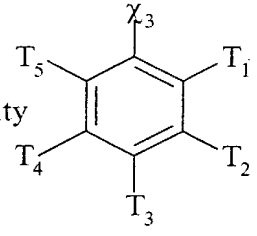


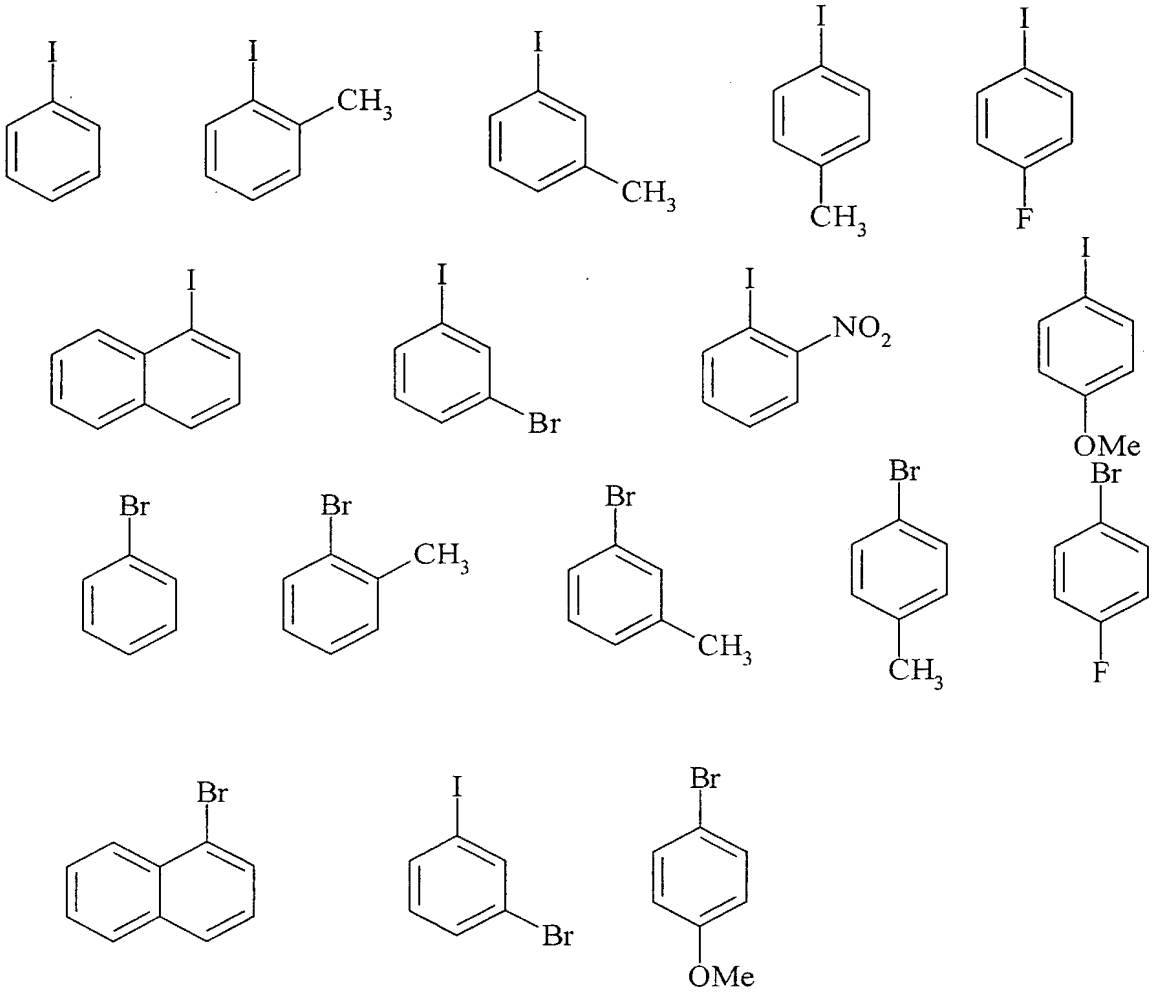
or



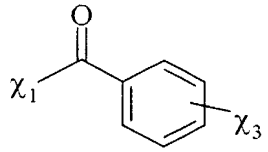
in which χ_2 represents either an $-OR_g$ group, R_g representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an $-NR_hR_u$ group, R_h and R_u representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

χ_3 representing a leaving group, in particular chosen from the I, Cl and Br halides, the mesylate, tosylate, triflate, sulphonate, sulphate or phosphate groups,

the entity  representing in particular the following groups:

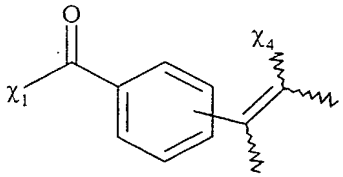


– F'$_1$ corresponds to the following formula:



χ_1 and χ_3 being as defined above,

– F'$_2$ corresponds to the following formula:

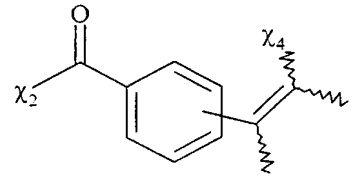


χ_1 being as defined above,

χ_4 representing a functional group of ester, amide, sulphone, phosphonate, silane, borane type, or a functional or non-functional alkyl group, comprising from 1 to 20 carbon atoms, or a functional or non-

functional aryl group, comprising from 6 to 30 carbon atoms,

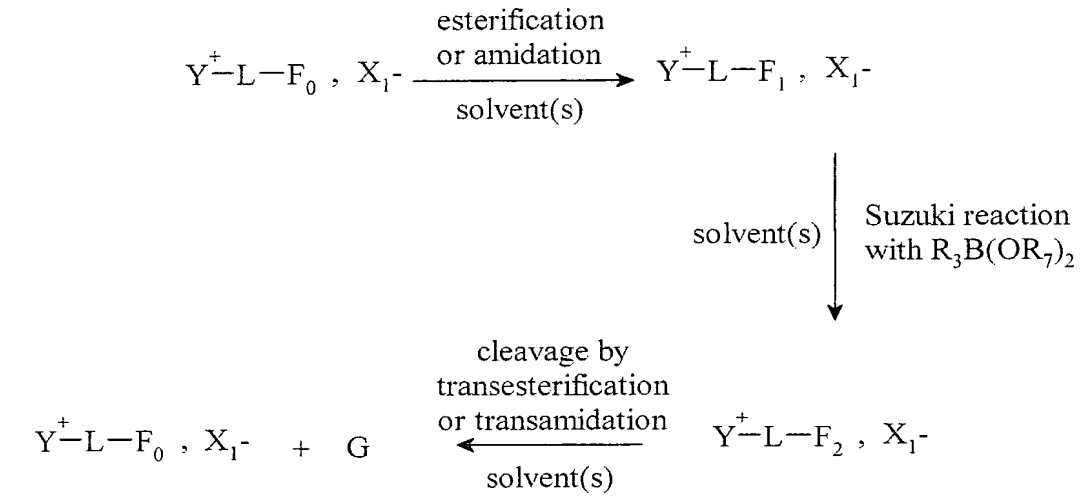
G' corresponding to the following formula:



χ_2 and χ_4 being as defined above.

21. The use according to claim 19 for the implementation of Suzuki coupling, according to one of the following reaction diagrams:

a)



R_3 being chosen from the aryl, heteroaryl, ethenyl, dienyl, allyl, ethynyl groups, substituted or non-substituted, comprising from 2 to 30 carbon atoms,

R_7 representing a hydrogen atom or a branched or linear alkyl group, or a cycloalkyl group comprising from 1 to 12 carbon atoms,

Y^+- representing an onium cation as defined in one of claims 3 to 17, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl group comprising from 6 to 30 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 1 to 10,

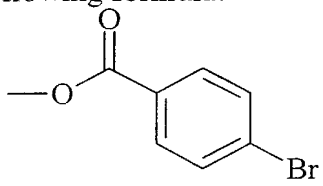
X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

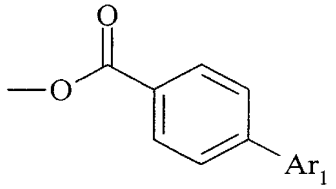
the functions F_0, F_1 and F_2 being as defined below:

– F_0 is in the form $-\chi_1H$, χ_1 representing an oxygen atom or an $-NR_f$ group, R_f corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

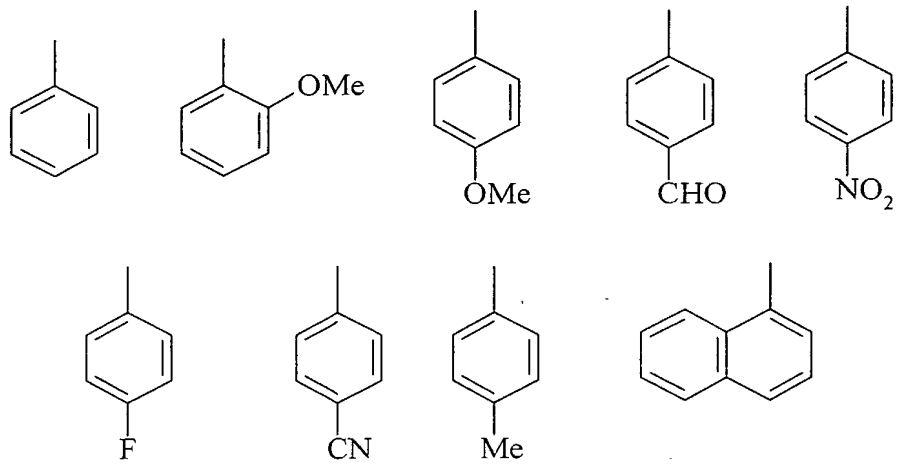
– F_1 is in the form $-R_e-\chi$, R_e representing an aromatic or heteroaromatic group comprising from 6 to 30 carbon atoms, χ representing a leaving group preferably chosen from Cl, Br, I, OTf, $O-CO_2R^5$ or OSO_3-R^5, R^5 representing an alkyl group comprising from 1 to 10 carbon atoms or an aralkyl group comprising from 6 to 30 carbon atoms, F_1 preferably corresponding to the following formula:



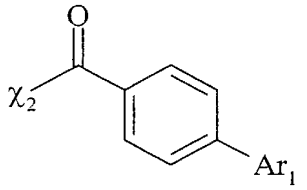
– F_2 is in the form $-R_e-R_2$, R_e being as defined above and R_2 being chosen from the aryl, heteroaryl, ethenyl, dienyl, allyl, ethynyl groups, substituted or non-substituted, comprising from 2 to 30 carbon atoms, F_2 preferably corresponding to the following formula:



Ar_1 representing an aromatic group preferably chosen from:



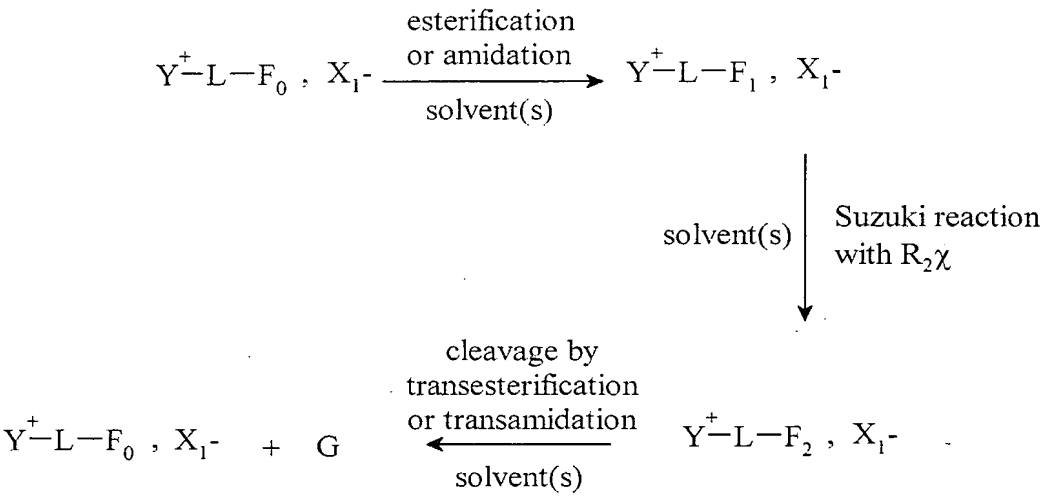
the molecule G being in the form R_2–R_3, R_2 and R_3 being as defined above, and corresponding in particular to the following formula:



in which χ_2 represents either an -OR_g group, R_g representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an -NR_hR_u group, R_h and R_u representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

Ar_1 is as defined above,

b)



Y^+– representing an onium cation as defined in one of claims 3 to 17, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl group comprising from 6 to 30 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 1 to 10,

X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

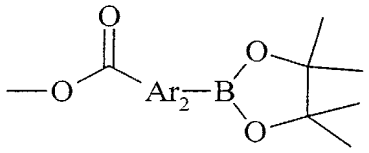
the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

R_2 being chosen from the aryl, heteroaryl, ethenyl, dienyl, allyl, ethynyl groups, substituted or non-substituted, comprising from 2 to 30 carbon atoms,

the functions F_0, F_1 and F_2 being as defined below:

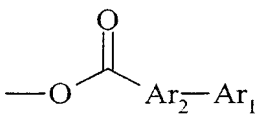
– F_0 is in the form $-\chi_1H$, χ_1 being as defined above,

– F_1 is in the form $-R_q-B(OR_7)_2$, R_7 being as defined above, and R_q corresponding to an aryl group comprising from 6 to 30 carbon atoms, heteroaryl comprising from 4 to 20 carbon atoms, ethenyl comprising from 2 to 20 carbon atoms, dienyl comprising from 3 to 20 carbon atoms, allyl comprising from 3 to 20 carbon atoms, ethynyl comprising from 2 to 20 carbon atoms, substituted or non-substituted, F_1 preferably corresponding to the following formula:

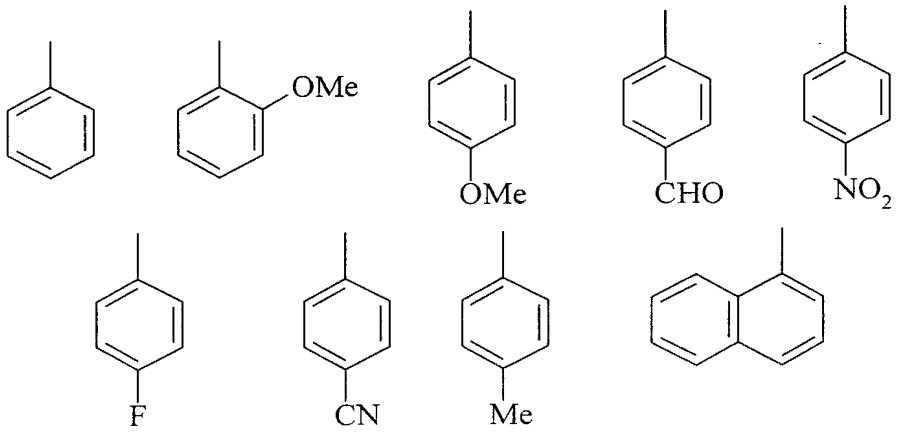


Ar_2 corresponding to an aryl group, substituted or non-substituted, comprising from 6 to 30 carbon atoms,

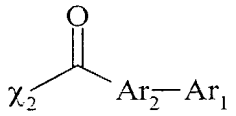
– F_2 is in the form $-R_q-R_e$, R_q and R_e being as defined above, F_2 preferably corresponding to the following formula:



Ar_1 representing an aromatic group preferably chosen from:

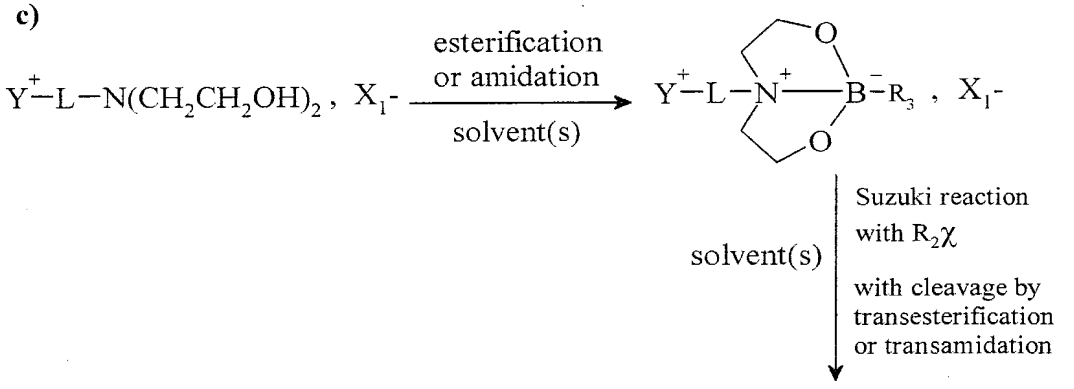


the molecule G being in the form R_2–R_3, R_2 and R_3 being as defined above, and corresponding in particular to the following formula:



in which χ_2, Ar_1 and Ar_2 are as defined above,

c)



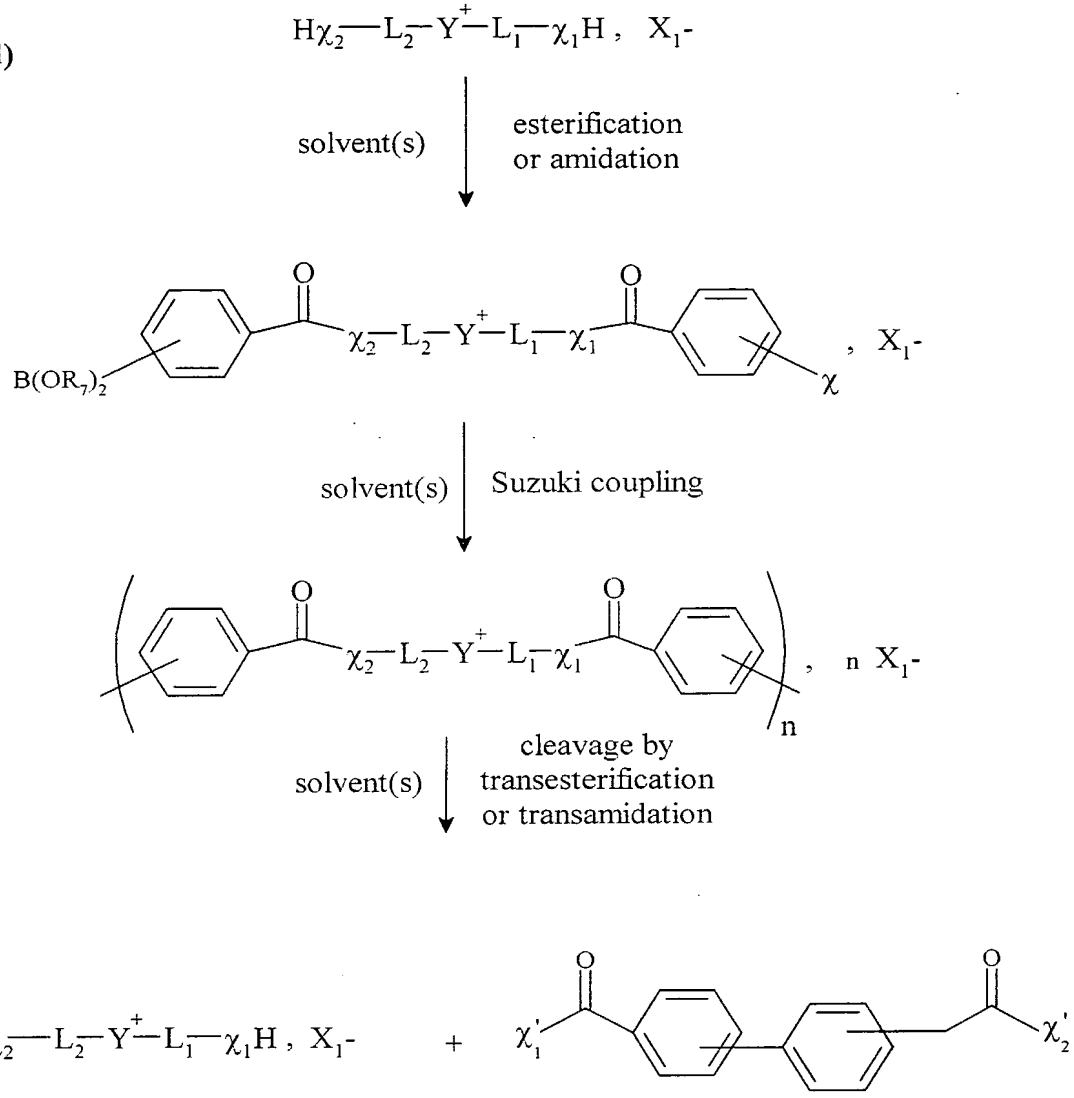
$$Y^+\text{—}L\text{—}N(CH_2CH_2OH)_2\ ,\ X_1^-\ +\ R_2\text{—}R_3$$

Y^+–, L, X_1^-, R_2 and R_3 being as defined above,

R_3 preferably being a phenyl group,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

d)



n representing an integer comprised between 1 and 50,

Y^+– representing an onium cation as defined in one of claims 3 to 17, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium cation,

L_1 and L_2 representing an arm, identical or different, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl group comprising from 6 to 30 carbon atoms, and preferably being a linear alkyl group preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 1 to 10,

X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

χ_1 and χ_2, identical or different, representing an oxygen atom or an $-NR_f$ group, R_f corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

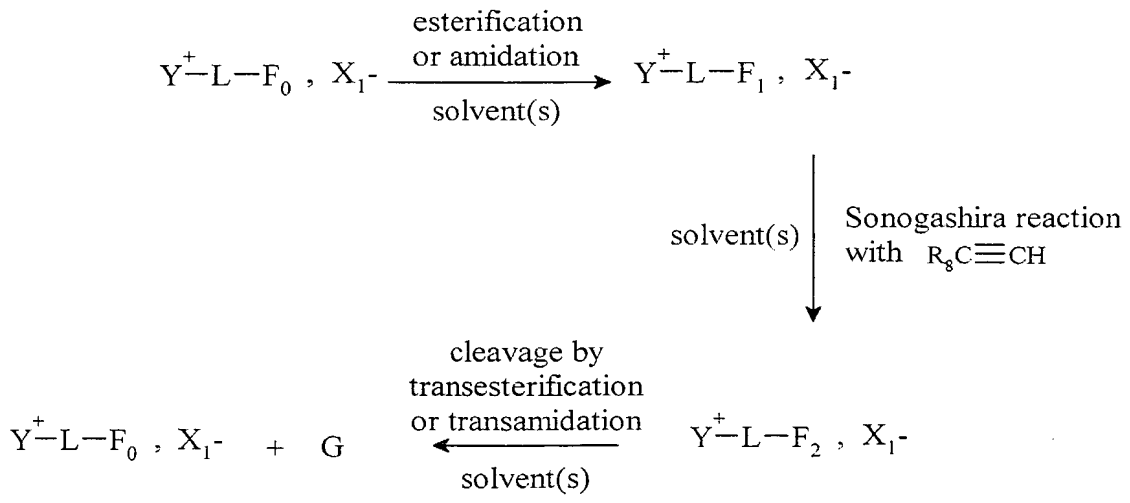
χ representing a leaving group preferably chosen from Cl, Br, I, OTf, $O\text{-}CO_2R^5$ or $OSO_3\text{-}R^5$, R^5 representing an alkyl group comprising from 1 to 10 carbon atoms or an aralkyl group comprising from 6 to 30 carbon atoms,

R_7 representing a hydrogen atom, a branched or non-branched alkyl group, or cycloalkyl, comprising from 1 to 12 carbon atoms, or an aryl group, comprising from 6 to 30 carbon atoms,

χ'_1 and χ'_2, identical or different, representing either an $-OR_g$ group, R_g representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an $-NR_hR_u$ group, R_h and R_u representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms.

22. The use according to claim 19 for the implementation of Sonogashira coupling, according to one of the following reaction diagrams:

a)



Y^+- representing an onium cation as defined in one of claims 3 to 17, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 1 to 10,

X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

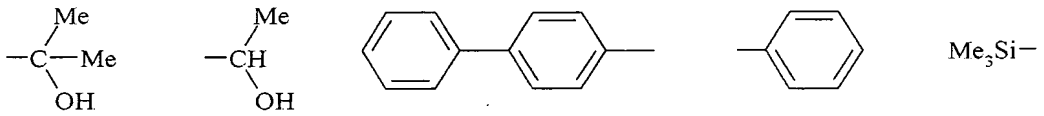
R_8 representing an OR_h, NR_hR_u, COR_h, CN, SO_2R_h, SR_h group, an alkenyl, ethynyl, dienyl group, R_h and R_u representing, independently of one another, a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

or R_8 representing an alkyl group, branched or linear, optionally functional, comprising from 1 to 20 carbon atoms, or an aryl group, or an alkaryl or aralkyl group, comprising from 6 to 30 carbon atoms, substituted or non-substituted, said alkyl or aryl groups being able to be substituted by one of the following functional groups: a halogen atom, in particular Cl, an OR_h, NR_hR_u, COR_h, CN, SO_2R_h, SR_h group, an alkenyl, ethynyl, dienyl, vinyl, alkynyl group, R_h and R_u being as defined previously,

R_8 being in particular one of the following groups:

$-(CH_2)_s-CH_3$, $-(CH_2)_s-CH_2OH$, $-(CH_2)_s-CH_2OMe$,

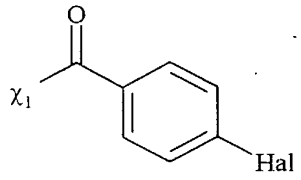
s representing an integer comprised between 0 and 10,



the functions F_0, F_1 and F_2 being as defined below:

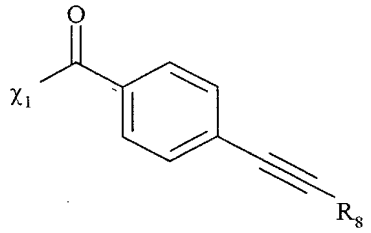
– F_0 corresponds to a $-\chi_1H$ group, in which χ_1 represents an oxygen atom or an $-NR_f$ group, R_f corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

– F_1 corresponds to the following formula:



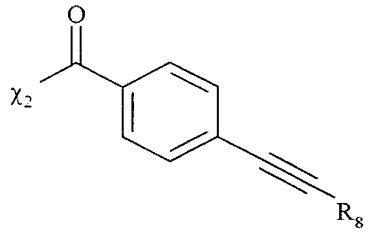
χ_1 being as defined above, and Hal representing a halogen, and preferably being iodine,

– F_2 corresponds to the following formula:



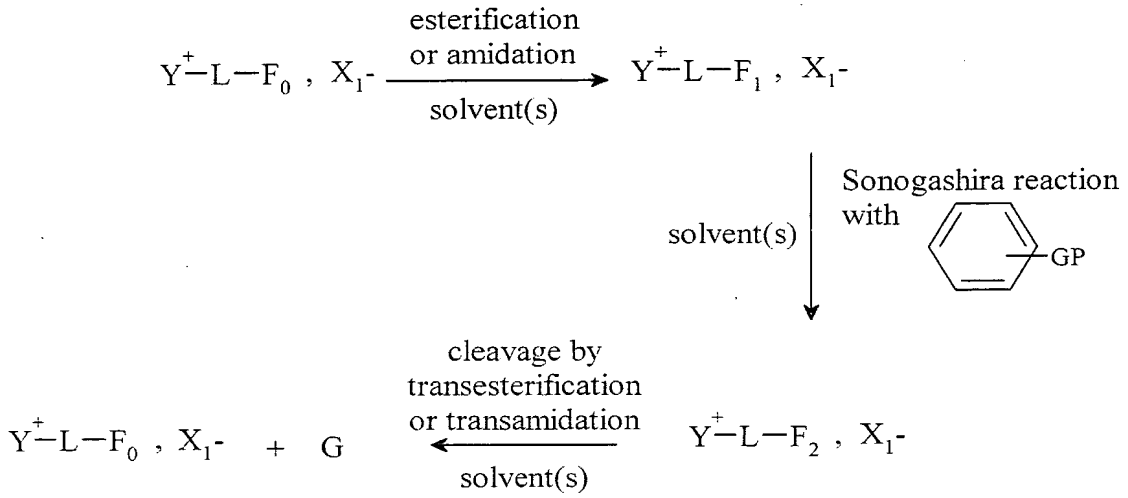
χ_1 and R_8 being as defined above,

G corresponding to the following formula:



in which χ_2 represents either an $-OR_g$ group, R_g representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an $-NR_hR_u$ group, R_h and R_u representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms, χ_2 representing in particular an OMe, OEt, OPr or OBu group.

b)



Y^+– representing an onium cation as defined in one of claims 3 to 17, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium, alkylpyridinium, dimethylalkylsulphonium or diethylalkyl-sulphonium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 1 to 10,

X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

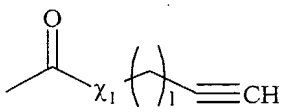
the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

GP representing a leaving group, and being in particular Cl, Br, I or OTf,

the functions F_0, F_1 and F_2 being as defined below:

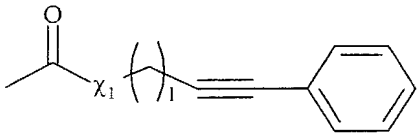
– F_0 corresponds to a -COOH group,

– F_1 corresponds to the following formula:



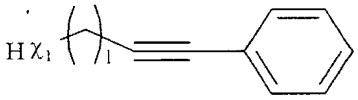
in which l represents an integer varying from 1 to 20, and χ_1 represents an oxygen atom or an $-NR_f$ group, R_f corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

– F_2 corresponds to the following formula:



χ_1 and l being as defined above,

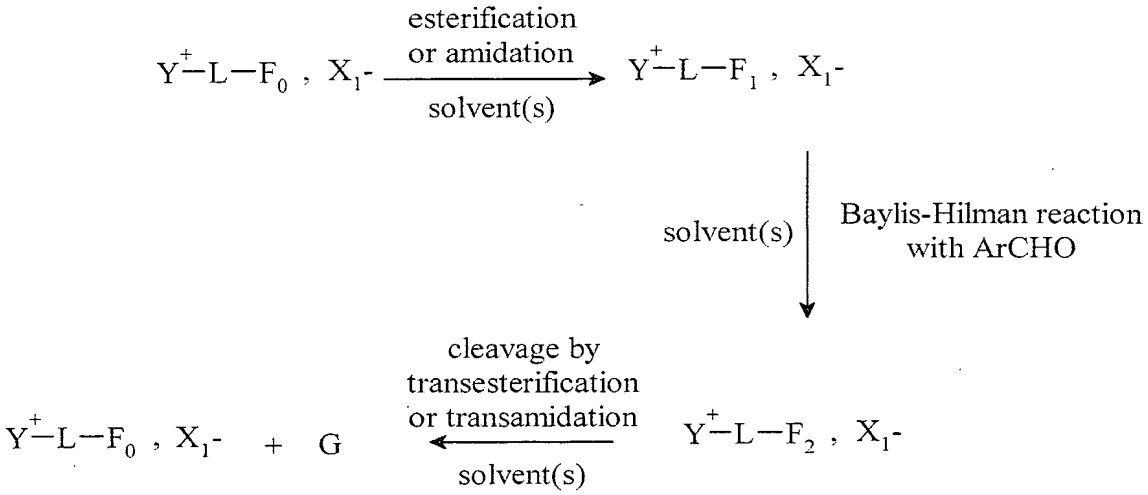
G corresponding to the following formula:



in which χ_1 and l are as defined above.

23. The use according to any one of claims 1 to 17, for the implementation of the Baylis-Hilman reaction, according to one of the following reaction diagrams:

a)



Y^+– representing an onium cation as defined in one of claims 3 to 17, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 1 to 10,

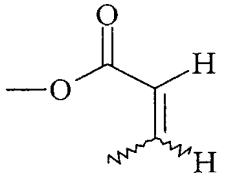
X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

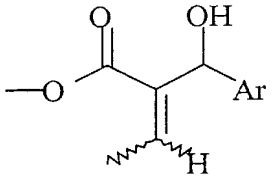
the functions F_0, F_1 and F_2 being as defined below:

– F_0 represents an -OH group,

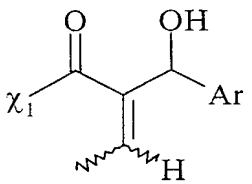
– F_1 corresponds to the following formula:



– F_2 corresponds to the following formula:



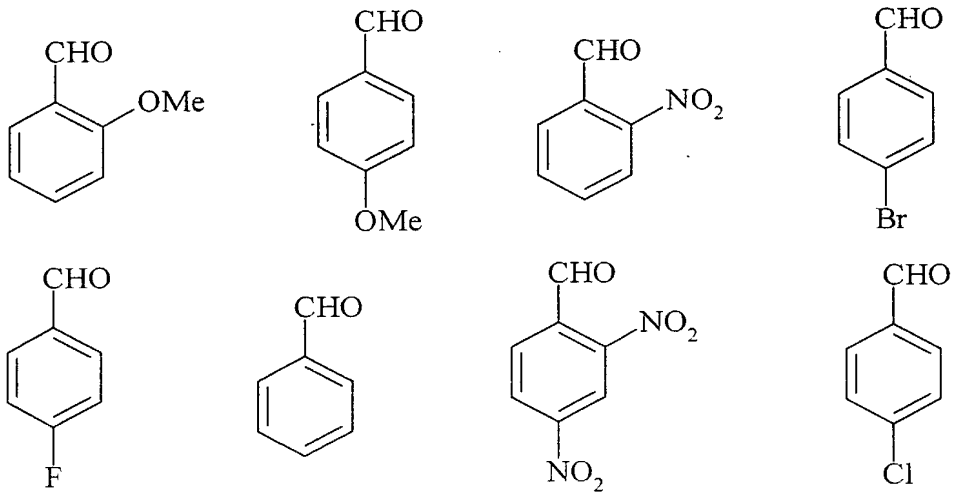
G corresponding to the following formula:



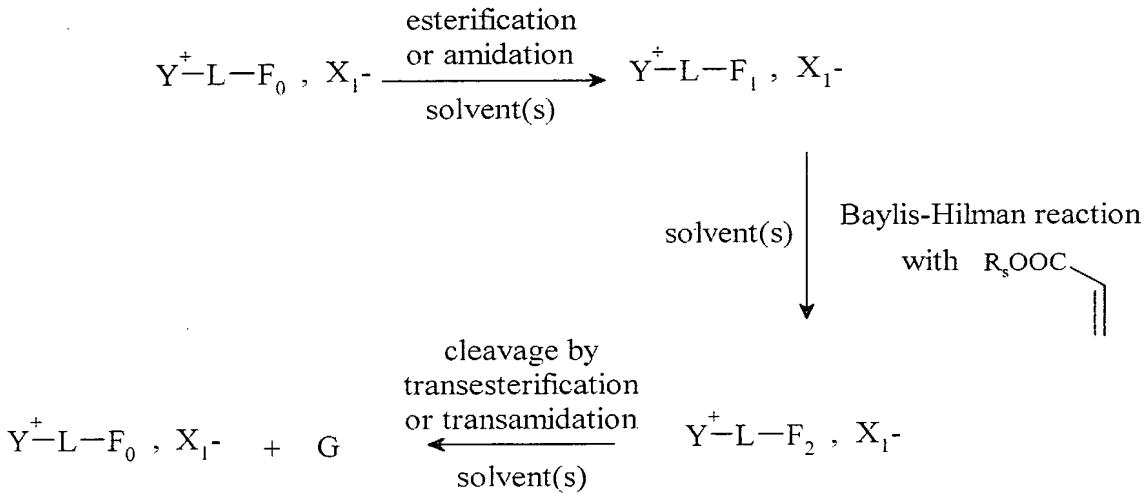
χ_1 representing an -OH group, or an $-OR_g$ group, R_g representing a linear or branched alkyl group, comprising from 1 to 20 carbon atoms,

Ar representing an aromatic or heteroaromatic group, substituted or non-substituted,

ArCHO being in particular chosen from:



b)



Y^+– representing an onium cation as defined in one of claims 3 to 17, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium, alkylpyridinium, dimethylalkylsulphonium or diethylalkyl-sulphonium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 1 to 10,

X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

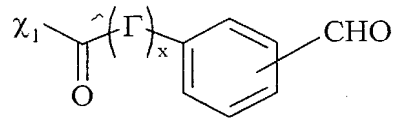
the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

R_s representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms or aralkyl or alkaryl comprising from 7 to 30 carbon atoms,

the functions F_0, F_1 and F_2 being as defined below:

– F_0 corresponds to a $-\chi_1H$ group, in which χ_1 represents an oxygen atom or an $-NR_f$ group, R_f corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

– F_1 corresponds to the following formula:

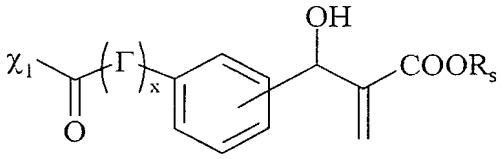


χ_1 being as defined above,

x being equal to 0 or 1,

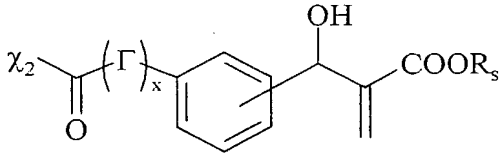
Γ representing an alkyl chain comprising from 1 to 20 carbon atoms, alkaryl, aralkyl comprising from 6 to 30 carbon atoms,

– F_2 corresponds to the following formula:



χ_1, x, R_s and Γ being as defined above

– G corresponding to the following formula:

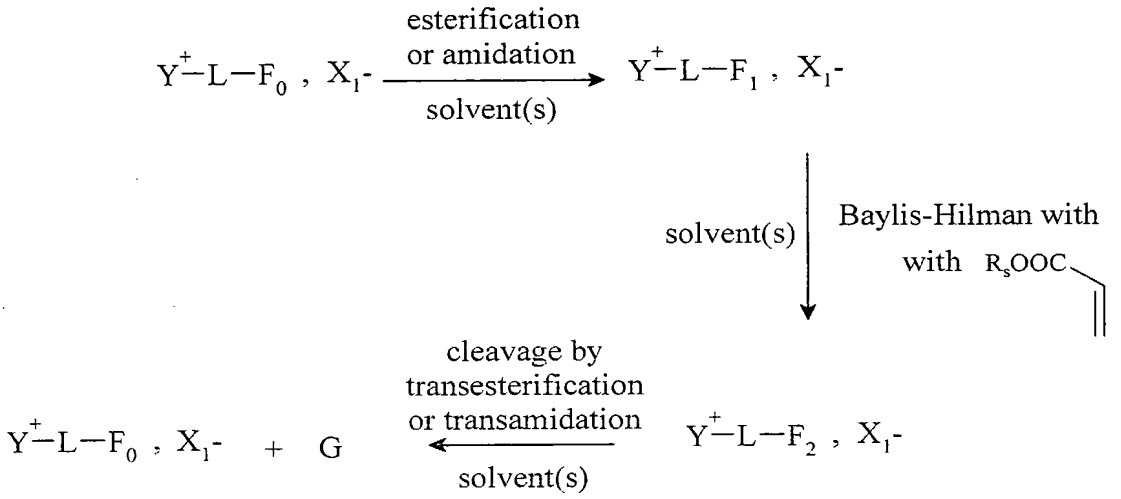


χ_2, x, R_s and Γ being as defined above

in which χ_2 represents either an $-OR_g$ group, R_g representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an $-NR_hR_u$ group, R_h and R_u representing independently of one another a hydrogen atom, an alkyl group comprising

from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms, χ_2 representing in particular an OMe, OEt, OPr or OBu group.

c)



Y^+– representing an onium cation as defined in one of claims 3 to 17, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methylimidazolium or pyridinium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 1 to 10,

X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

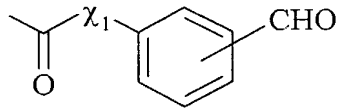
the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

R_s representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms or aralkyl or alkaryl comprising from 7 to 30 carbon atoms,

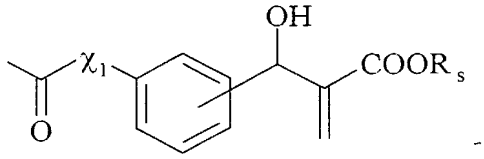
the functions F_0, F_1 and F_2 being as defined below:

– F_0 corresponds to a -$CO\chi_1H$ group, in which χ_1 represents an oxygen atom or an -NR_f group, R_f corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

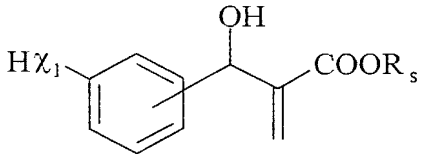
– F_1 corresponds to the following formula:



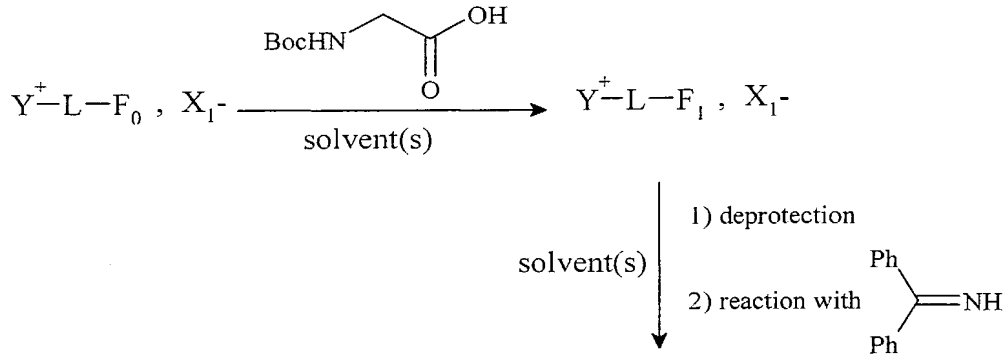
– F_2 corresponds to the following formula:



– G corresponding to the following formula:



24. The use according to any one of claims 1 to 17, for the synthesis, optionally asymmetrical, of α-amino acids, according to the following reaction diagram:



Y^+– representing an onium cation as defined in one of claims 3 to 17, and preferably being a trimethylalkylammonium, triethylalkylammonium or tributylalkylphosphonium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl group comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 3 to 6,

X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $^-N(SO_2CF_3)_2$, BF_4^-, PF_6^-,

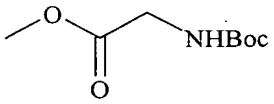
the solvent or solvents being chosen from: acetonitrile, dichloromethane, tetrahydrofuran, dioxane, toluene, chlorobenzene or a mixture of these solvents,

R' representing a linear or branched alkyl group, comprising from 1 to 30 carbon atoms, optionally functional,

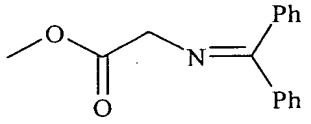
S^* representing a chiral phase transfer agent such as O(9)-allyl-N-9-anthracenyl-methylcinchonidinium bromide,

the functions F_0, F_1 and F_2 being as defined below:

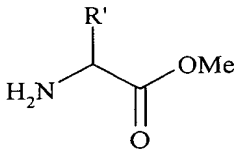
- F_0 corresponds to -OH,
- F_1 corresponds to the following formula:



- F_2 corresponds to the following formula:

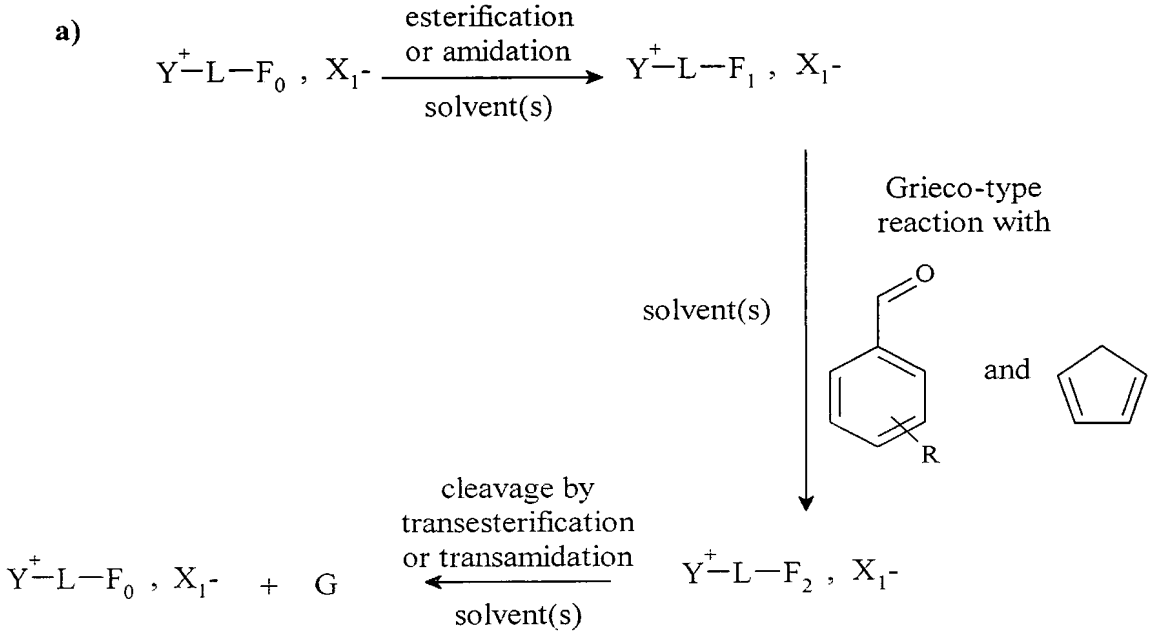


G corresponding to the following formula:



25. The use according to any one of claims 1 to 17, for the implementation of multi-component reactions, in particular for the Grieco-type reaction according to one of the following reaction diagrams:

a)



Y^+– representing an onium cation as defined in one of claims 3 to 17, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methyl-N'-alkylimidazolium, N-alkylpyridinium, dimethylalkylsulphonium or diethylalkylsulphonium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 1 to 10,

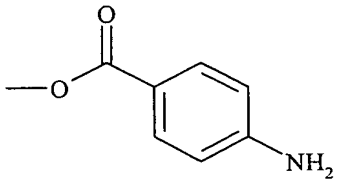
X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

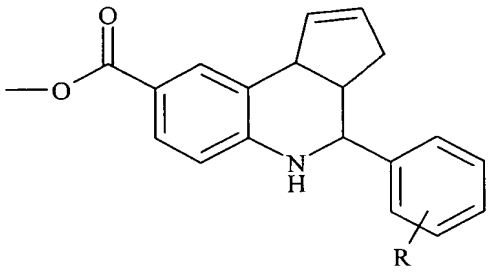
R representing a hydrogen atom, a nitro group in para position, a chlorine atom in para position or a methoxy group in ortho position,

the functions F_0, F_1 and F_2 being as defined below:

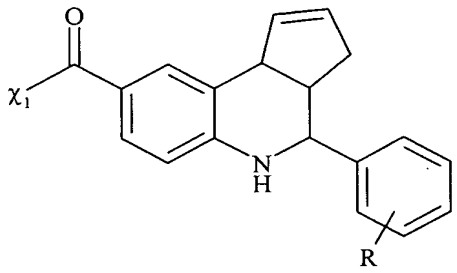
- F_0 represents an -OH group,
- F_1 corresponds to the following formula:



- F_2 corresponds to the following formula:

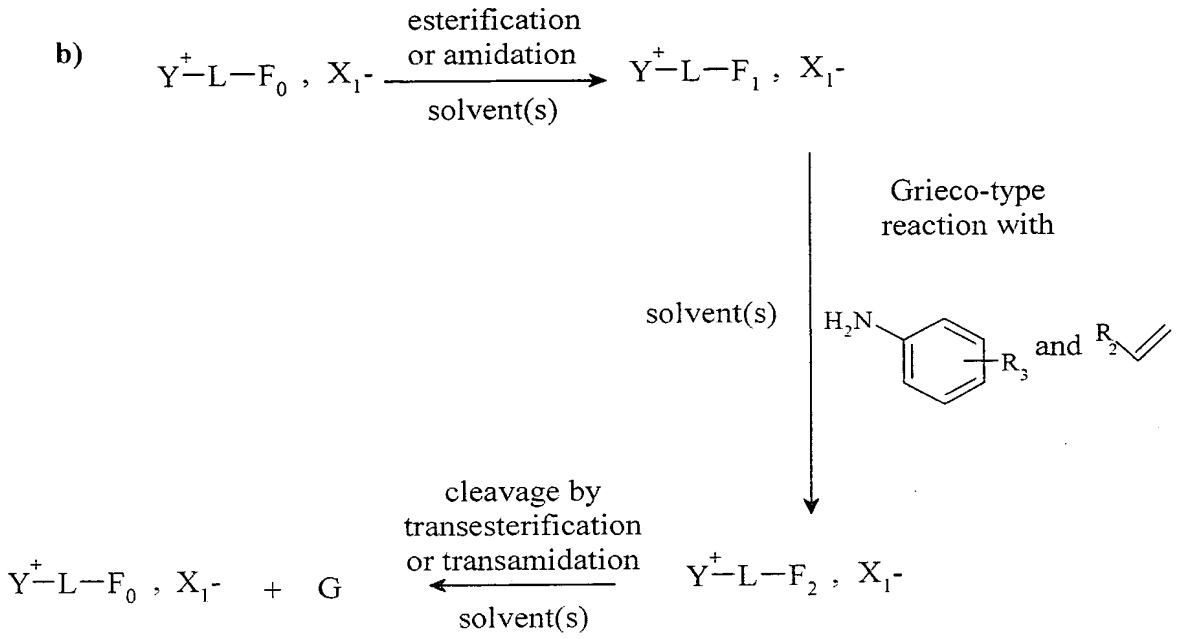


G corresponding to the following formula:



χ_1 representing an -OH group, or an $-OR_g$ group, R_g representing a linear or branched alkyl group, comprising from 1 to 20 carbon atoms,

b)



Y^+– representing an onium cation as defined in one of claims 3 to 17, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methyl-N'-alkylimidazolium, N-alkylpyridinium, dimethylalkylsulphonium or diethylalkylsulphonium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 1 to 10,

X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

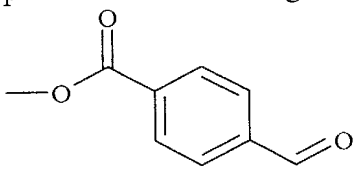
R_2 representing a functional or non-functional alkyl group, comprising from 1 to 20 carbon atoms, or a functional or non-functional aryl group, comprising from 6 to 30

carbon atoms, or an aralkyl or alkaryl group, functional or non-functional, comprising from 7 to 50 carbon atoms,

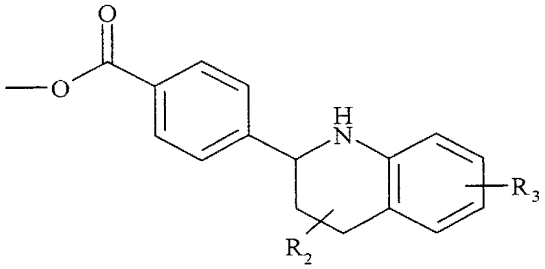
R_3 representing a hydrogen atom, a linear or branched alkyl group, comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms, or an aralkyl or alkaryl group, functional or non-functional, comprising from 7 to 50 carbon atoms, or a functional group in particular chosen from NO_2, CN, COOR, OR, COR, NHCOR, NRR', SO_2R, I, Br, R and R' representing independently of one another an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

the functions F_0, F_1 and F_2 being as defined below:

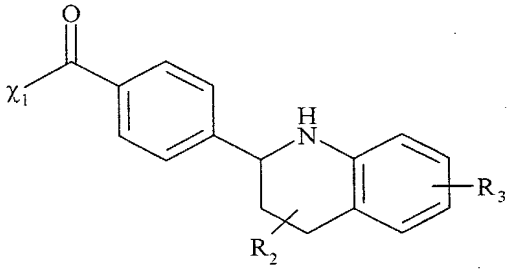
- F_0 represents an -OH group,
- F_1 corresponds to the following formula:



- F_2 corresponds to the following formula:

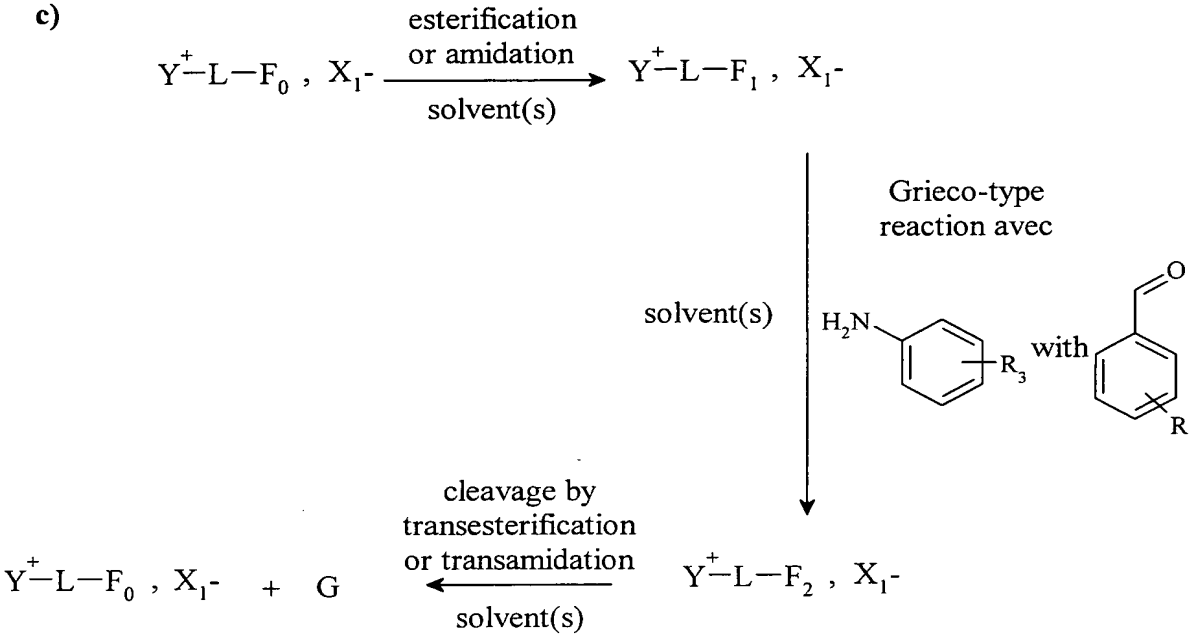


G corresponding to the following formula:



χ_1 representing an -OH group, or an $-OR_g$ group, R_g representing a linear or branched alkyl group, comprising from 1 to 20 carbon atoms.

c)



Y^+– representing an onium cation as defined in one of claims 3 to 17, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methyl-N'-alkylimidazolium, N-alkylpyridinium, dimethylalkylsulphonium or diethylalkylsulphonium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 1 to 10,

X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

R representing a hydrogen atom or a functional group such as a nitro group in para position, a chlorine atom in para position or a methoxy group in ortho position, or a

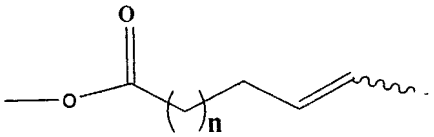
functional or non-functional alkyl group, comprising from 1 to 20 carbon atoms, or a functional or non-functional aryl group, comprising from 6 to 30 carbon atoms, or an aralkyl or alkaryl group, functional or non-functional, comprising from 7 to 50 carbon atoms,

R_3 representing a hydrogen atom, a linear or branched alkyl group, comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms, or an aralkyl or alkaryl group, functional or non-functional, comprising from 7 to 50 carbon atoms, or a functional group in particular chosen from NO_2, CN, COOR, OR, COR, NHCOR, NRR', SO_2R, I, Br, R and R' representing independently of one another an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

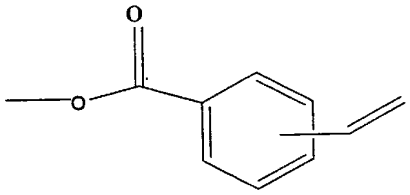
the functions F_0, F_1 and F_2 being as defined below:

– F_0 represents any function making it possible to attach and release a radical carrying an olefin, preferably an ester, or an amide.

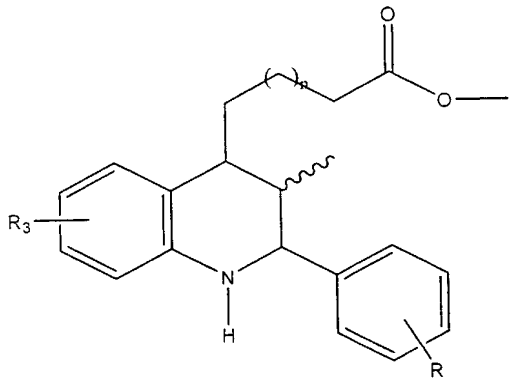
– F_1 corresponds to one of the following general formulae:

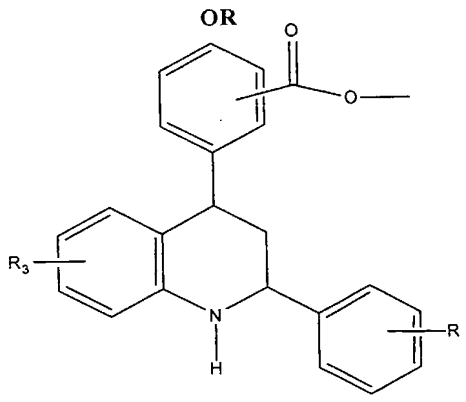


n representing an integer varying from 1 to 10

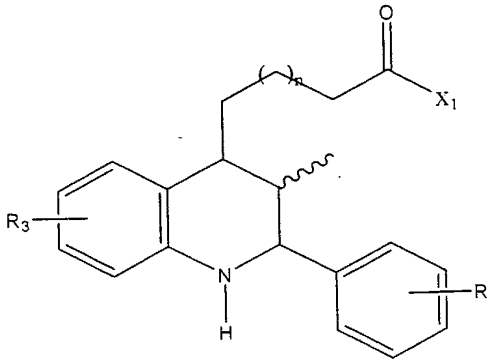


– F_2 corresponds to one of the following general formulae:

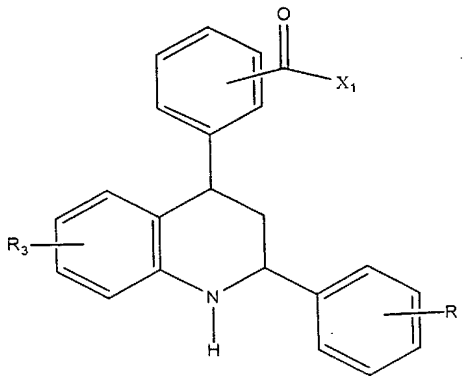




G corresponding to one of the following general formulae:



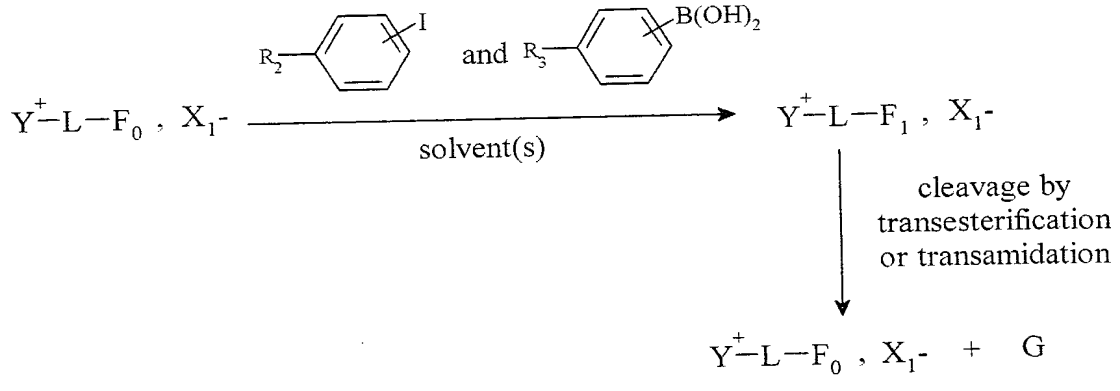
OR



n, R and R_3 being as defined above, and

χ_1 representing an -OH group, or an $-OR_g$ group, R_g representing a linear or branched alkyl group, comprising from 1 to 20 carbon atoms.

26. The use according to any one of claims 1 to 17, for the implementation of multi-component reactions, in particular for the synthesis of tetrasubstituted olefins, according to the following reaction diagram:



Y+– representing an onium cation as defined in one of claims 3 to 17, and preferably being a trimethylalkylammonium, triethylalkylammonium, tributylalkylphosphonium, N-methyl-N'-alkylimidazolium, N-alkylpyridinium, dimethylalkylsulphonium or diethylalkylsulphonium cation,

L representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group,

preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 1 to 10,

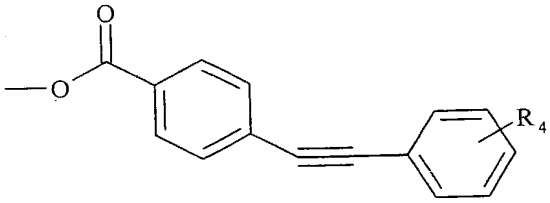
X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

R_2 and R_3, preferably in para position, representing a hydrogen atom, a linear or branched, optionally functional alkyl group comprising from 1 to 30 carbon atoms, an optionally substituted and/or functional aryl group, comprising from 6 to 30 carbon atoms, a functional group, preferably a methoxy, mono-alkylamino, dialkylamino, arylamino, cyano, ester, nitro, ketone, sulphonyl, alkylthio, sulphoxide group,

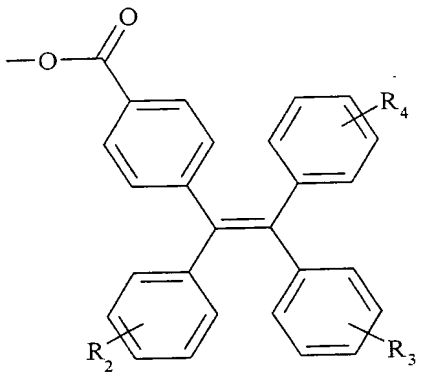
the functions F_0 and F_1 being as defined below:

– F_0 corresponds to the following formula:

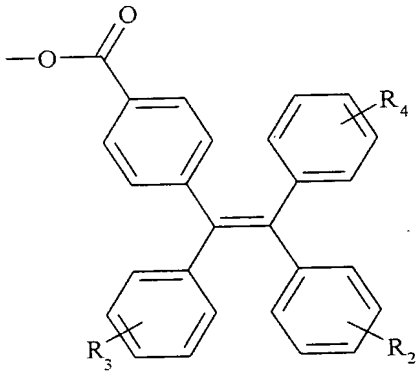


R_4 representing a group as defined for R_2 and R_3 above,

– F_1 corresponds to one of the following formulae:

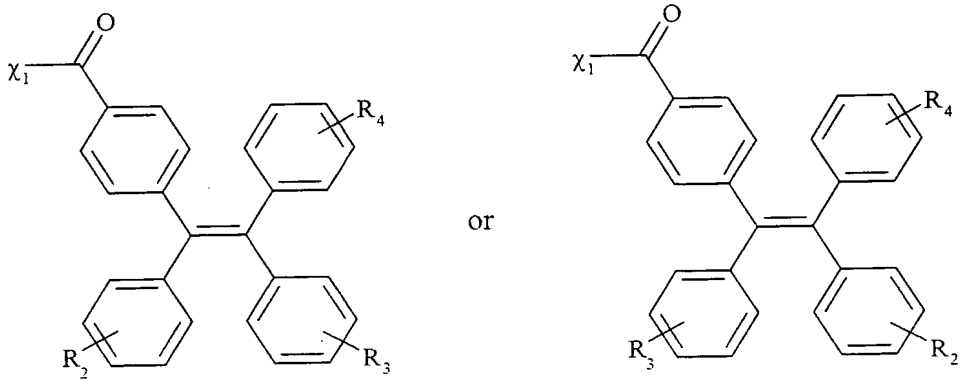


or



R_2, R_3 and R_4 being as defined above,

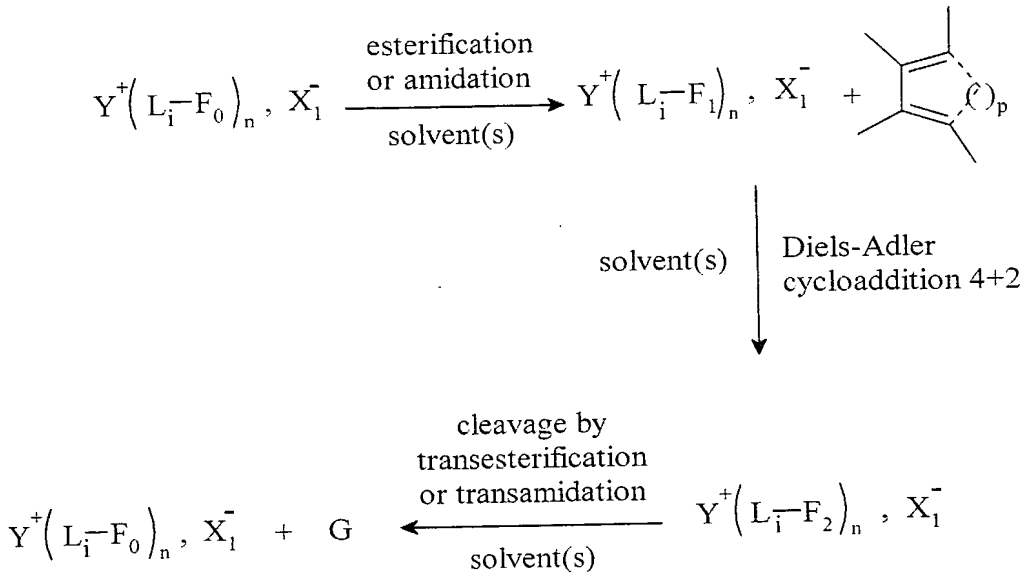
G corresponds to one of the following formulae:



or

χ_1 representing an -OH group, or an -OR_g group, R_g representing a linear or branched alkyl group, comprising from 1 to 20 carbon atoms.

27. The use according to any one of claims 1 to 17, for the implementation of cycloaddition reactions, preferably for the implementation of the Diels-Alder reaction, according to the following reaction diagram:



n being an integer varying from 2 to 4, as defined below,

i being an integer varying from 1 to n,

p being an integer varying from 0 to 2,

Y^+ representing an onium cation as defined in one of claims 3 to 17, of formula $(R_b)_{x-n}A^+$ in which x represents an integer equal to 3 or 4, n being equal to 2, 3 or 4

when x is equal to 4 and n being equal to 2 or 3 when x is equal to 3, R_b represents an alkyl group comprising from 1 to 20 carbon atoms, an aryl group comprising from 6 to 30 carbon atoms or an aralkyl or alkaryl group comprising from 6 to 30 carbon atoms, said abovementioned alkyl, aryl, aralkyl or alkaryl groups being non-functional, and in which Λ^+ represents an ammonium, imidazolium, phosphonium or sulphonium cation, Y^+ representing in particular an alkylammonium, alkylphosphonium or alkylsulphonium cation, and preferably being a tetraalkylammonium, tetraalkylphosphonium, dialkylimidazolium, trialkylsulphonium cation,

L_i representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 6 to 30 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 2 to 10, the arms L_i being able to be identical or different,

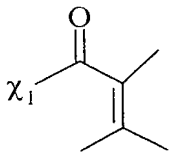
X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

the functions F_0, F_1 and F_2 being as defined below:

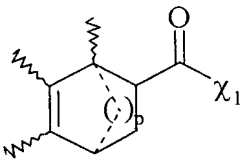
– F_0 corresponds to a $-\chi_1H$ group, in which χ_1 represents an oxygen atom or an $-NR_f$ group, R_f corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

– F_1 corresponds to the following formula:



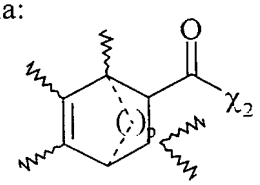
χ_1 being as defined above,

– F_2 corresponds to the following formula:



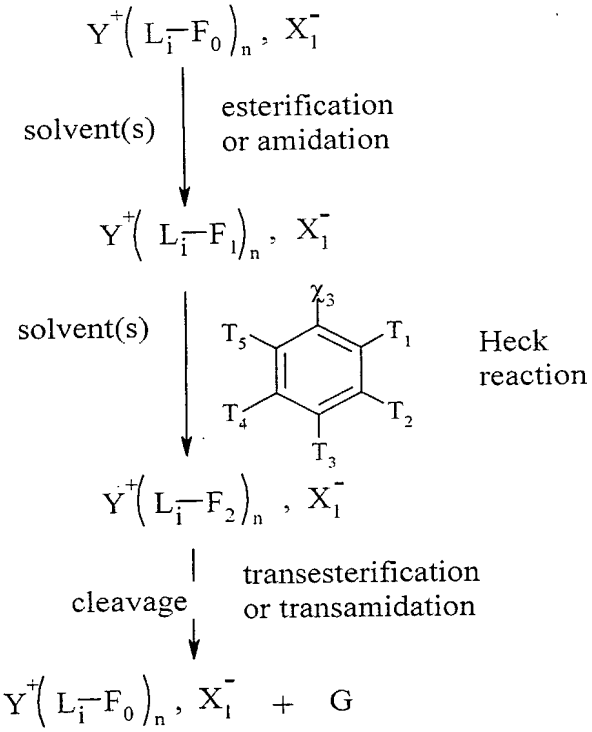
χ_1 being as defined above,

G corresponding to the following formula:



in which χ_2 represents either an OR_g group, R_g representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an $-NR_hR_u$ group, R_h and R_u representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms.

28. The use according to claim 19, for the implementation of the Heck reaction, according to the following reaction diagram:



n being an integer varying from 2 to 4,

i being an integer varying from 1 to n,

Y^+ representing an onium cation as defined in one of claims 3 to 17, of formula $(R_b)_{x-n}A^+$ in which x represents an integer equal to 3 or 4, n being equal to 2, 3 or 4 when x is equal to 4 and n being equal to 2 or 3 when x is equal to 3, R_b represents an

alkyl group comprising from 1 to 20 carbon atoms, an aryl group comprising from 6 to 30 carbon atoms or an aralkyl or alkaryl group comprising from 6 to 30 carbon atoms, said abovementioned alkyl, aryl, aralkyl or alkaryl groups being non-functional, and in which Λ^+ represents an ammonium, imidazolium, phosphonium or sulphonium cation, Y^+ representing in particular an alkylammonium, alkylphosphonium or alkylsulphonium cation, and preferably being a tetraalkylammonium, tetraalkylphosphonium, dialkylimidazolium, trialkylsulphonium cation,

L_i representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 2 to 10, the arms L_i being able to be identical or different,

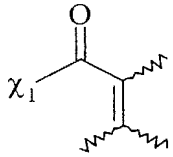
X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

the functions F_0, F_1 and F_2 being as defined below:

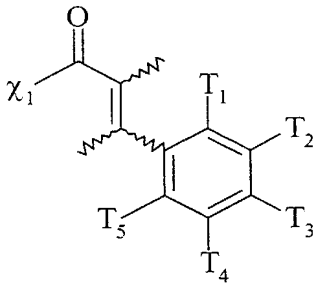
– F_0 corresponds to a $-\chi_1H$ group, in which χ_1 represents an oxygen atom or an $-NR_f$ group, R_f corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

– F_1 corresponds to the following formula:



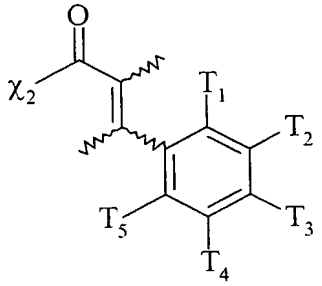
χ_1 being as defined above,

– F_2 corresponds to the following formula:



χ_1 being as defined above,

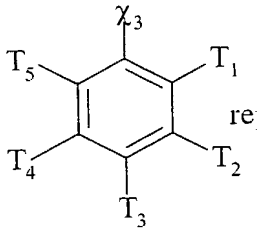
G corresponding to the following formula:

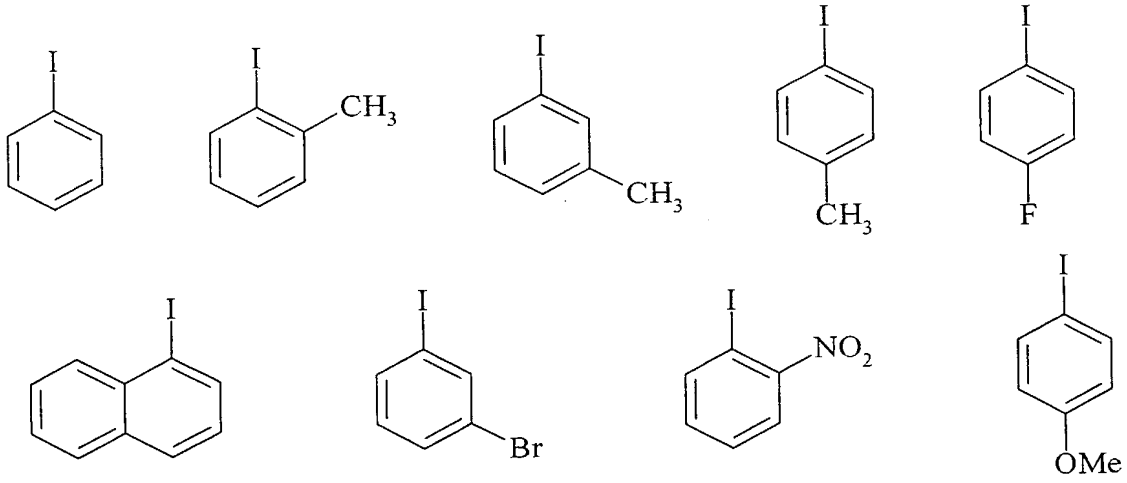


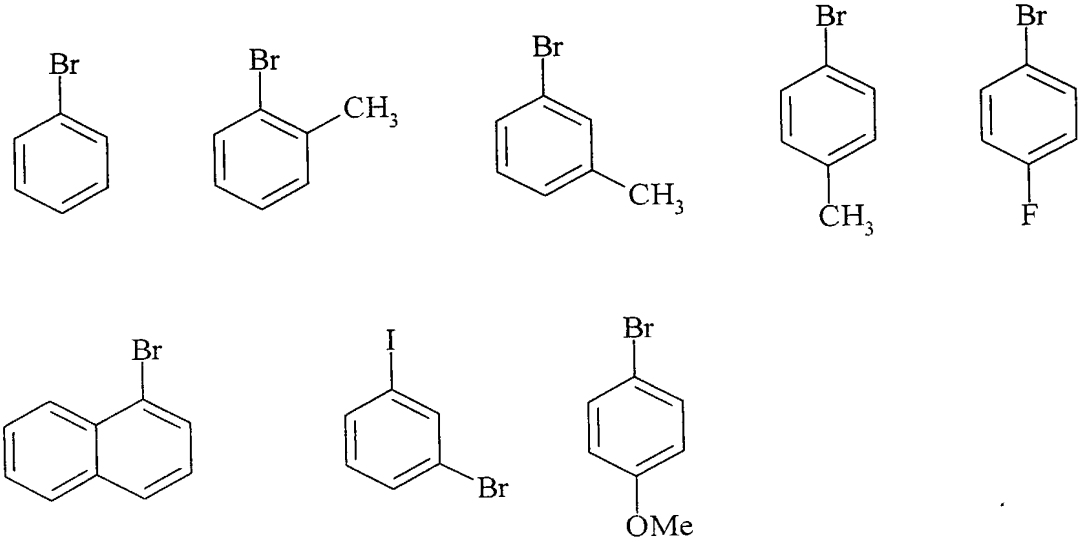
in which χ_2 represents either an $-OR_g$ group, R_g representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an $-NR_hR_u$ group, R_h and R_u representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

χ_3 representing a leaving group, in particular chosen from the I, Cl and Br halides, the mesylate, tosylate, triflate, sulphonate, sulphate or phosphate groups,

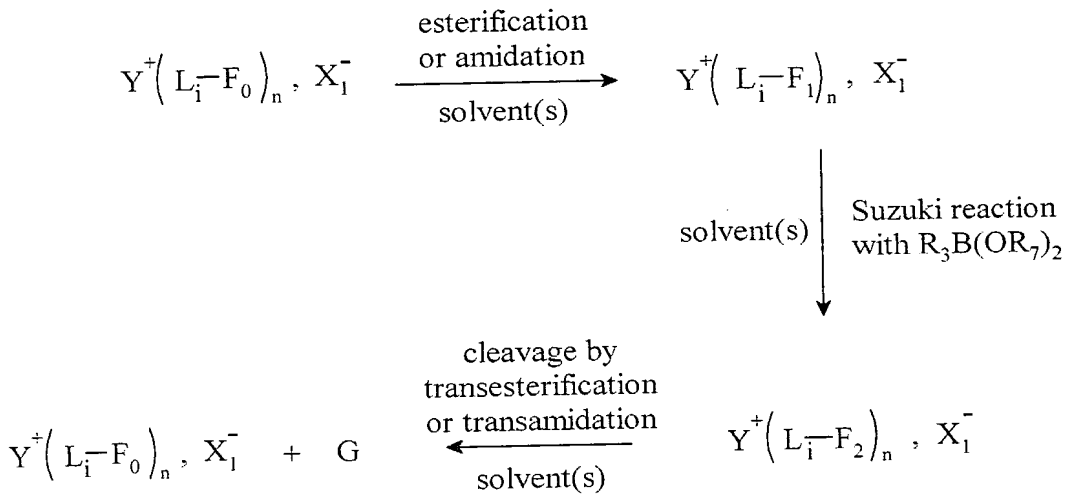
T_1, T_2, T_3, T_4 and T_5 representing independently of one another a hydrogen atom, a linear or branched alkyl group, comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms, or a functional group in particular chosen from NO_2, CN, COOR, OR, COR, NHCOR, NRR'', SO_2R, I, Br, R and R'' representing independently of one another an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

the entity  representing in particular the following groups:





29. The use according to claim 19, for the implementation of Suzuki coupling, according to the following reaction diagram:



R_3 being chosen from the substituted or non-substituted aryl, heteroaryl, ethenyl, dienyl, allyl, ethynyl groups, comprising from 2 to 30 carbon atoms,

R_7 representing a hydrogen atom or a branched or linear alkyl group, or a cycloalkyl group comprising from 1 to 12 carbon atoms,

n being an integer varying from 2 to 4,

i being an integer varying from 1 to n,

Y^+ representing an onium cation as defined in one of claims 3 to 17, of formula $(R_b)_{x-n}A^+$ in which x represents an integer equal to 3 or 4, n being equal to 2, 3 or 4 when x is equal to 4 and n being equal to 2 or 3 when x is equal to 3, R_b represents an alkyl group comprising from 1 to 20 carbon atoms, an aryl group comprising from 6 to 30 carbon atoms or an aralkyl or alkaryl group comprising from 6 to 30 carbon atoms, said abovementioned alkyl, aryl, aralkyl or alkaryl groups being non-functional, and in which A^+ represents an ammonium, imidazolium, phosphonium or sulphonium cation, Y^+ representing in particular an alkylammonium, alkylphosphonium or alkylsulphonium cation, and preferably being a tetraalkylammonium, tetraalkylphosphonium, dialkylimidazolium, trialkylsulphonium cation,

L_i representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 2 to 10, the arms L_i being able to be identical or different,

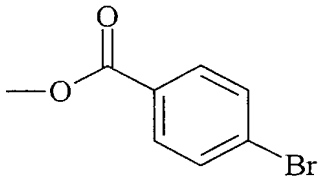
X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

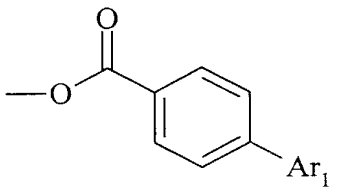
the functions F_0, F_1 and F_2 being as defined below:

– F_0 is in the form $-\chi_1H$, χ_1 representing an oxygen atom or an $-NR_f$ group, R_f corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

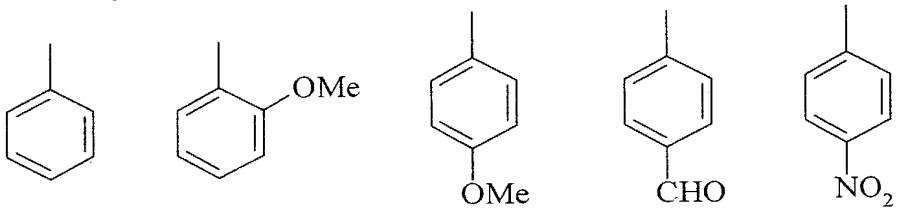
– F_1 is in the form $-R_e-\chi$, R_e representing an aromatic or heteroaromatic group comprising from 6 to 30 carbon atoms, χ representing a leaving group preferably chosen from Cl, Br, I, OTf, $O\text{-}CO_2R^5$ or $OSO_3\text{-}R^5$, R^5 representing an alkyl group comprising from 1 to 10 carbon atoms or an aralkyl group comprising from 6 to 30 carbon atoms, F_1 preferably corresponding to the following formula:

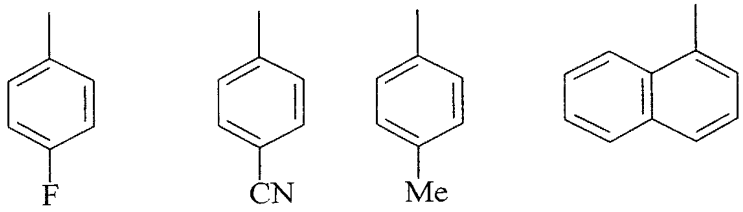


– F_2 is in the form $-R_e-R_2$, R_e being as defined above and R_2 being chosen from the aryl, heteroaryl, ethenyl, dienyl, allyl, ethynyl groups, substituted or non-substituted, comprising from 2 to 30 carbon atoms, F_2 preferably corresponding to the following formula:

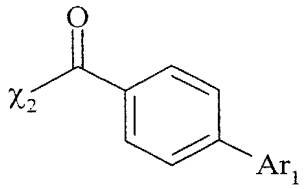


Ar_1 representing an aromatic group preferably chosen from:





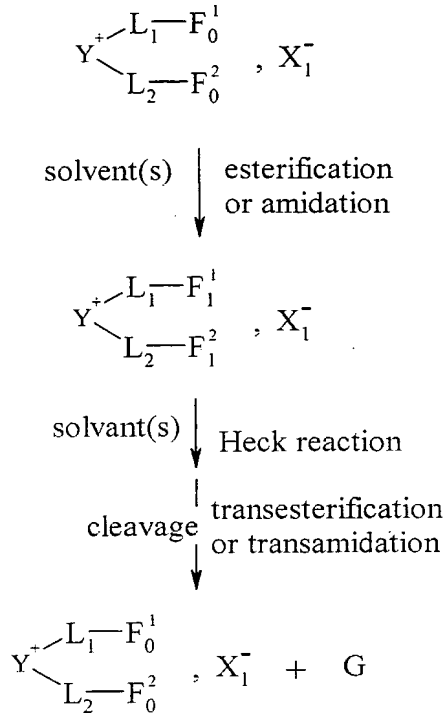
the molecule G being in the form R_2-R_3, R_2 and R_3 being as defined above, and corresponding in particular to the following formula:



in which χ_2 represents either an $-OR_g$ group, R_g representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an $-NR_hR_u$ group, R_h and R_u representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms,

Ar_1 is as defined above.

30. The use according to claim 19, for the implementation of the Heck reaction, according to the following reaction diagram:



Y^+ representing an onium cation as defined in one of claims 3 to 17, of formula $(R_b)_{x-2}\Lambda^+$ in which x represents an integer equal to 3 or 4, R_b represents an alkyl group comprising from 1 to 20 carbon atoms, an aryl group comprising from 6 to 30 carbon atoms or an aralkyl or alkaryl group comprising from 6 to 30 carbon atoms, said abovementioned alkyl, aryl, aralkyl or alkaryl groups being non-functional, and in which Λ^+ represents an ammonium, imidazolium, phosphonium or sulphonium cation, Y^+ representing in particular an alkylammonium, alkylphosphonium or alkylsulphonium cation, and preferably being a tetraalkylammonium, tetraalkylphosphonium, dialkylimidazolium, trialkylsulphonium cation, Λ^+ representing an ammonium or phosphonium cation when x = 4 and a sulphonium cation when x = 3,

L_1 and L_2, identical or different, representing an arm, in particular a linear or branched alkyl group comprising from 1 to 20 carbon atoms, or an optionally functional aralkyl or alkaryl group, comprising from 1 to 20 carbon atoms, and preferably being a linear alkyl group, preferably a linear alkyl group of type $(CH_2)_r$, r varying from 1 to 20, and preferably from 2 to 10,

X_1^- being as defined in one of claims 1 to 17, and being in particular Cl^-, Br^-, I^-, $CF_3CO_2^-$, $CH_3CO_2^-$, BF_4^-, PF_6^-, $CF_3SO_3^-$, $^-N(SO_2CF_3)_2$, SO_4^{2-}, $R_1SO_4^-$, SbF_6^-, $R_1SO_3^-$, FSO_3^-, PO_4^{3-}, R_1 representing an alkyl group comprising from 1 to 20 carbon atoms,

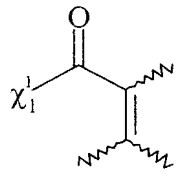
the solvent or solvents being chosen from: dichloromethane, tetrahydrofuran, dioxane, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidinone, propionitrile, acetone, toluene, chlorobenzene, nitrobenzene, dichlorobenzene, nitromethane, nitroethane, or a mixture of these solvents,

the functions F_0^1, F_1^1, F_0^2 and F_1^2 being as defined below:

– F_0^1 corresponds to a $-\chi^1{}_1H$ group, in which $\chi^1{}_1$ represents an oxygen atom or an $-NR_f$ group, R_f corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

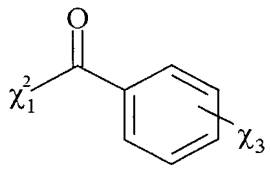
– F_0^2 corresponds to a $-\chi^2{}_1H$ group, in which $\chi^2{}_1$ represents an oxygen atom or an $-NR_f$ group, R_f corresponding to a linear or branched alkyl group, comprising from 1 to 20 carbon atoms, or an aryl group comprising from 6 to 30 carbon atoms,

– F_1^1 corresponds to the following formula:



$\chi^1{}_1$ being as defined above,

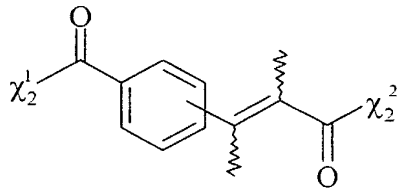
– F_1^2 corresponds to the following formula:



$\chi^2{}_1$ being as defined above, and

χ_3 representing a leaving group, in particular chosen from the I, Cl and Br halides, the mesylate, tosylate, triflate, sulphonate, sulphate or phosphate groups,

G corresponding to the following formula:



in which χ_2^1 and χ_2^2, identical or different, represent either an $-OR_g$ group, R_g representing a hydrogen atom or an alkyl group comprising from 1 to 20 carbon atoms, or an $-NR_hR_u$ group, R_h and R_u representing independently of one another a hydrogen atom, an alkyl group comprising from 1 to 20 carbon atoms or an aryl group comprising from 6 to 30 carbon atoms.